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ABSTRACT

A study investigated the feasibility of developing school-related packages to assist secondary school students in their movement through secondary school, into and through postsecondary occupational preparatory programs, and ultimately into the world of work. Three phases occurred simultaneously. The first determined the approach to be followed--the generic skills approach. A second phase assessed business, health sciences, and technology programs offered in the community colleges to determine skills/competencies required for entry. The third phase involved an analysis of available curriculum outlines. The outcome of the research was that school-related packages were judged to be feasible. Rather than using a generic skills approach in its purest form, the 13 packages guided students toward occupational families in three fields: business, health, and technology. Research showed that, as students moved from secondary schools into colleges, gaps existed in students' background in communications, computation, problem solving, and knowledge of responsibilities associated with the preparation for a specific vocation or group of vocations. Overlaps were found between the two systems, particularly in course and text duplications. Pilot testing of package drafts with secondary school and college officials provided feedback to ensure package relevance, usefulness, and ease of use. (The school-related packages are appended.) (YLB)

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SCHOOL-RELATED PACKAGES TO SUPPORT OS:IS

A Feasibility Study

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U.S. DEPARTMENT OF EDUCATION
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ABSTRACT

The Ontario Secondary School Teachers' Federation has been concerned about secondary students' transition from school into the workplace. Consequently, and with the support of the Ministry of Education, the OSSTF undertook a research project to investigate the feasibility of employing school-related packages to facilitate this process. School-related packages are defined in OS:IS as a collection of courses designed to support a particular curricular emphasis (e.g., academic, vocational, etc.). The project was guided by an advisory group composed of OSSTF, and Ministry of Education, Ministry of Colleges and Universities, and Ministry of Skills Development representatives.

The first step of the research was to identify the basic principles which would underlie the development of such packages. The study encompassed the planning, implementation, and evaluation of school-related packages for that group of students who are bound for work entry after completing secondary school and for those who continue on to complete post-secondary college programs. Then, preliminary packages were developed for occupational families in the fields of Business, Health, and Technology.

A review of the literature and current practices related to generic skills was undertaken and the following data were collected and analyzed: Ministry of Education documents such as SERP, ROSE, OS:IS, and Curriculum Guidelines (old and new); a 33% sample of secondary school calendars for two years (1984-85 and 1985-86); college calendars and documents from all 22 Ontario community colleges (CAATs); and face-to-face interviews with Registrars or Admissions' Officers and Deans of Business, Health Science, and Technology Departments at ten of the CAATs.

The outcome of the research was that school-related packages were judged to be feasible, adhering to a set of ten principles. Rather than using a generic skills' approach in its purist form, the packages take the form of combinations and sequences of courses not only within one subject area but also crossing over into several subject areas, using the existing secondary schools' infrastructure. The objective of the packages would be to guide the students (both within and outside of the formal secondary school organization) towards a family of occupations.

The research identified the fact that gaps existed in students' background as they moved from the secondary schools into the colleges not only in the areas of communications, computation, and problem-solving, but also in their knowledge of the responsibilities associated with the preparation for a specific vocation or group of vocations. As well, it was found that overlaps exist between the two systems, particularly in course and text duplication. The pilot testing of the drafts of school-related packages with both secondary school and college officials, moreover, provided feedback to ensure the relevance, usefulness, and ease of use of these packages.

The specific outcome of this research is twofold: one is a collection of 13 school-related packages illustrating format and content; and the second is a series of suggestions to the various organizations involved -- The Ministry of Education, the school boards, the secondary schools, the Ministry of Colleges and Universities, and the community colleges -- suggestions designed to encourage the understanding, application, and widespread use of school-related packages to support OS:IS.

ACKNOWLEDGEMENTS

The Social Program Evaluation Group of Queen's University carried out research for the Ontario Secondary School Teachers' Federation. The aim of this study was to investigate the feasibility of developing school-related packages with a view to assisting secondary school students in their movement through secondary school, into and through post-secondary occupational preparatory programs, and ultimately into the world of work.

The research team was both guided and supported by an Advisory Committee. The members of that Committee as well as all those individuals in the secondary schools and in the post-secondary educational systems who provided us with information, all demonstrated a high degree of interest and co-operation in the study. We appreciate their involvement.

To the members of the Advisory Committee, we would like to extend a special thanks for their interest, support, and technical advice: John Kenny, Supervisor, Research Contracts, Ministry of Education/Colleges and Universities and Chairman of our Committee; John MacKenzie, Curriculum Branch, Ministry of Education; Abel Nightingale, Ministry of Colleges and Universities and Ministry of Skills Development; Cliff Morris, Ontario Secondary School Teachers' Federation; Ralph Magel, Huron Heights Secondary School; and Ben Pounder, Glendale Secondary School.

Several other individuals deserve mention for their input into the school-related packages included in Appendix C of this report. We appreciate the contributions of Tom Tidey and Bob Harkness in the Business section, Regina Borowska and Norma Clark in the Health section, and George Isford and John Cowan in the Technological section.

We would also like to extend a special thank you to the support staff who, indefatigably, provided us with secretarial assistance -- Verena Carl, Bonnie Knox, and Jill Wing.

Despite able assistance and continuous feedback from the Advisory Committee, the research team must assume full responsibility for the content of this report, including any errors or omissions.

Alan King, Principal Investigator
Ruth Rees, Associate Investigator
September, 1985

I. INTRODUCTION

Rationale

Society today is in the midst of change, to such an extent that it has been named "the turbulent 80's." That change is evident within every aspect of our society: changing demographics, where the bulk of the population (the post-war baby boom) is now aging and where an increased number of females comprise the work force; rapid advancement in technology making many jobs redundant, creating new jobs, and forcing individuals to consider further training or re-training; and a changing economy which is shifting in focus from manufacturing towards the service sector. The result is that money is tight, with fewer jobs to go around. Yet the young adults who are emerging from our secondary schools require training and further education in order to enter and, successfully, to stay in the work force as productive, satisfied adults.

In response to these and other educational concerns, the Ministry of Education undertook a massive review of education beginning in 1981, which culminated in a report entitled Ontario School: Intermediate and Senior Divisions, 1984 (OS:IS). It has been called "A Chance for Change;" advocating change in virtually every part of the Ontario secondary school system in order for that system more adequately to meet the needs of the 1980s, including that of developing each student to become a contributing, responsible member of society. Curriculum revisions building upon and integrating core or basic competencies were to be only one outcome of this sweeping document. A core curriculum with mandatory subjects, along with a more integrated or holistic approach to education were recommended in order to reinforce these competencies across the curriculum and better prepare students for their (future) world of work, as well as leisure.

Specifically, this study was undertaken to investigate the feasibility of developing school-related packages that would complement the objectives of OS:IS. To quote from Section 5.9 (pp. 23-24) of OS:IS:

> The term 'school-related packages' identifies a particular set of courses planned by the school to provide a curricular emphasis for students who may have a specific educational goal in mind. Through collaborative planning, teachers can build relationships among courses within a particular package to facilitate direct entry by students into employment or training in a particular area of study....

> All school-related packages should be fully described in the school course calendar. Where business studies or technological studies form the area of concentration, successful achievement of the package could lead to an endorsement on the student's transcript....
>
> A typical package with a technological studies focus may have Auto Mechanics as the subject of communication and could include a selection of related courses in small engines, electricity, science (physics), mathematics, accountancy and English/français....

The packages would be designed to operationalize many recommendations of OS:IS by allowing a student to explore a variety of occupational/vocational paths and then focus on a more particular career goal or goals. Our task was to examine the range of competencies required by different occupations and for further post-secondary training in the colleges, and to compare that with the range of competencies offered in the secondary school curriculum areas. From this process, tentative packages were to be developed.

At the outset, the school-related packages were not viewed as sequences of courses within one subject area or even cutting across subject areas. More encompassing, they were viewed as a progression of competencies spanning several subject areas with a general occupational focus in mind. The result could have entailed a reorganization of content across courses with appropriate additions but the possibility of integrating a set of currently offered courses was also to be considered. Whatever the format, the packages would be offered for development as a means of facilitating a student's movement towards (successful) career goal attainment.

The Students

The study entitled Secondary School To Work (King & Hughes, 1985) provides a strong argument for the need to focus attention on two groups of students -- one group which takes the majority of its secondary school courses at the Basic level of difficulty, and the second which takes the majority of its courses at the General level of difficulty. Those of the former group who have intentions of entering directly into the work force require academic, reasoning, interpersonal, and manipulation skills for jobs. It is anticipated that programs for that group, which comprises about 8% of Ontario's secondary school student population, will be addressed in a subsequent study. It is the second group, the group in the middle, which is one of the major targets for school-related packages. The vast majority of these students will go directly to work from secondary school; others will attend a community college first. But also, to make the issue even more complex, many of the students who take mainly Advanced level courses will also benefit by considering the same packages of courses.

Although the retention in secondary schools has increased, and this is attributed to high unemployment of the 15 to 19 age group as a whole (King & Hughes, p. 16), the experience of students who take mainly General level courses appears to be neither productive nor rewarding. The report indicates that while 38% of the original Grade 9 group graduate from school with a high school diploma, the remaining 62% have suffered failure in core courses early in secondary school and have become discouraged.

Of the 38% who graduate, few have had vocational training in the form of work experience or co-operative education. Yet the majority of this cohort seek employment within their immediate environment. On the one hand, they end up competing for the same jobs as their non-graduating peers; on the other hand, they are competing for the same jobs as the Grade 12 students graduating with mainly Advanced level courses who did not go on to complete Grade 13. It is not surprising then to learn that this group forms a disproportionately large portion of the unemployed, experiencing frequent lay-offs as well. Yet most of the graduates have stated that the decision not to proceed to college is their own; it is neither a result of barriers such as college admission policies, nor due to financial constraints.

Those who go on to college form the minority of the Grade 12 students graduating with general courses. King's (1983) results are highlighted in Figures 1 and 2 (below). Figure 1 indicates the educational background of students enrolled in college post-secondary programs. King found that approximately 45% of students who entered college post-secondary programs took mainly General level courses in their last years of secondary school. (It must be remembered, however, that many of this group were enrolled in Grade 9 in primarily Advanced level courses.)

Figure 1
EDUCATIONAL BACKGROUND OF STUDENTS ENROLLED
IN CAAT POST-SECONDARY PROGRAMS

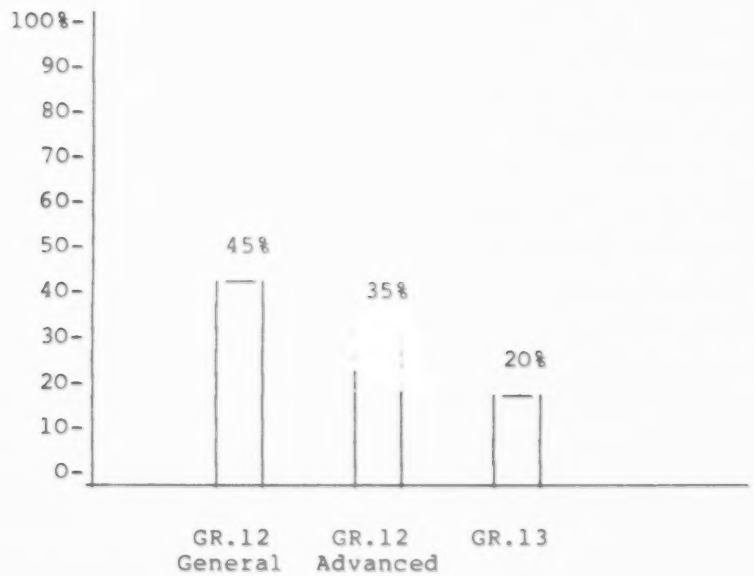
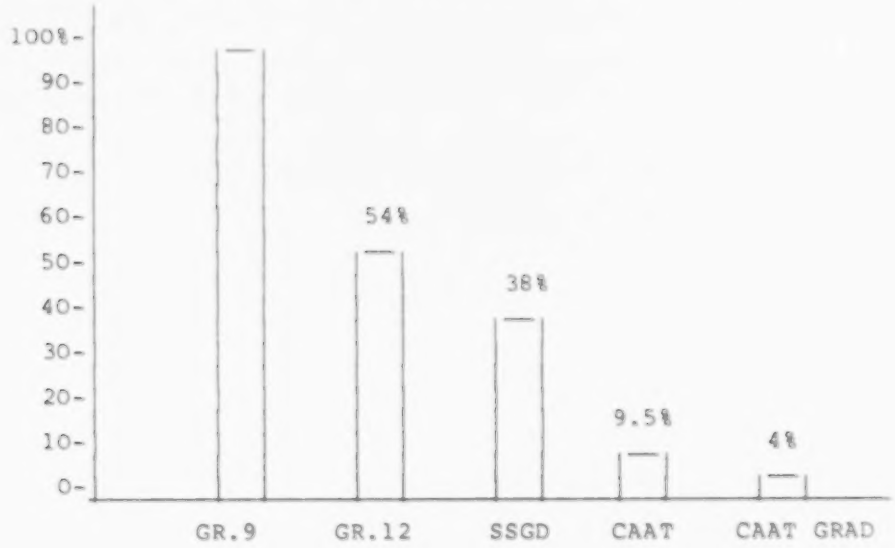


Figure 2 more specifically illustrates the woeful tale of the students progressing from General level courses in Grade 9 through to college graduation. While only one-quarter of the secondary school graduates of this group goes on to college, less than one-half completes a college program. To quote from the King and Hughes report (p. 30), "The likelihood of a student who takes mainly General level courses in Grade 9 completing a college program is one in twenty-five. If the primary purpose of General level courses is presented by school counsellors as preparation for the colleges, then students are being seriously misled."

Figure 2

GENERAL LEVEL STUDENT PROGRESS: GRADE 9 THROUGH CAAT



These students require realistic career awareness programs throughout secondary school. First of all, for those students who have no careers in mind, opportunities are needed in the early years of secondary school to allow them to explore diverse occupational avenues. The increased number of core courses prescribed within OS:IS must not deter students from this important activity. And secondly, those students who are able to focus on an occupational path (however general) must be allowed to prepare themselves, in the later school years, for work or for successful entrance into and, more importantly, successful exit from the college.

Training for specific occupations is probably not realistic for the secondary school. Students are wise to maintain a reasonably wide range of options in these early years; specific skill training is best done on-the-job and within colleges; and labour force needs are constantly and quickly changing. But providing opportunities to these students to focus, possibly in Grade 10, on an occupational family and further narrowing that choice in Grades 11 and/or 12 may be the most viable approach. However, this two-step decision-making approach to career preparation requires guidance in the secondary school. Some means for communicating these occupational options must be developed and made available to the student body. The mechanism for assisting students in these career decisions has been identified by the Ministry as school-related packages. The intention of this research is to conceptualize the formulation of such packages, and the OS:IS document provides the basic direction.

It must be understood, however, that this research project is not intended to develop a full range of school-related packages, but only a sampling following the more fundamental stage of conceptualizations regarding how these packages will be developed. A considerable amount of work has been carried out by teachers of the Business and Technological Studies' programs toward the development of subject-related packages. The Linkage programs are products of this type of development. Hence a decision was made by the Advisory Committee that the research team would develop school-related packages in three areas: Business, Health Science, and Technological Studies. University-bound sequences, apprenticeship programs, and programs incorporating Basic level courses would be excluded. It is recognized that school-related packages should be developed for the Linkage programs (in accordance with the recommendation of OS:IS, p.28), as well as for the more academic programs whose families of occupations require post-secondary preparation in universities. As a start, however, the research will address itself to a sample of programs for students seeking guidance for non-university occupations in the areas of Business, Health Science, and Technology (non-apprenticeship).

Overview of the Study

The study consisted of three distinct phases which were ongoing simultaneously. The first, and the most important, was to determine the approach that would be followed. The generic skills approach to skill development appeared to complement our mandate. That approach was investigated and then considered as a basis for developing the school-related packages. Second, Business, Health Sciences, and Technology programs offered in the community colleges were assessed in order to determine what skills/competencies were required for entry. The third phase involved an analysis of the available curriculum guidelines, many of which are undergoing revision or development by committees co-ordinated by Ministry officials. By combining the data, we were able to identify gaps and overlaps between the secondary school and college.

As well, we thought it important to investigate how the secondary schools were beginning to implement the OS:IS document. In what direction are they moving? This answer would provide some focus for the organization and hence proposed implementation of the school-based packages. After selectively sampling secondary schools and by means of documentary analysis of their 1984-85 and 1985-86 calendars, we were able to formulate some principles which would form the backbone for the development of the packages.

Using the information gained from our study of generic skills, secondary school courses, and college two and three year programs, school-related packages were developed in the three areas of Business, Health, and Technology, following these principles. Again, the aim was to provide some direction to that large group of students who do not plan on going to university (excluding those taking Basic level courses).

These packages were then vetted by a selection of community college personnel, secondary school teachers, and Ministry program and curriculum consultants to assess their relevance and usefulness. Their suggestions were incorporated into revised packages.

The last section of the report includes some suggestions that have come out of the data collection and analysis. The suggestions are addressed to the distinct groups within the education system: Ministry of Education officials, school boards, schools, Ministry of Colleges and Universities and Ministry of Skills Development officials, and the colleges.

Our major purpose in this research was to develop a set of fundamental principles to determine the approach for the development and use of school-related packages. These principles are presented in section III of the report. They provided the guidelines for the actual development of the school-related packages. The purpose of such packages would be for student counselling and across-subject course sequencing.

II. ANALYSIS OF THE GENERIC SKILLS APPROACH

Overview

The first task undertaken was to analyze the generic skills approach to determine its viability for developing school-related packages. This task involved a review of the literature and ongoing activities in the field, as well as communications with experts in the area of generic skills including Arthur Smith, Vern Mullen, Michael Banks, Christine Townsend, and personnel in the colleges and in the three Ministries of Education, Colleges and Universities, and Skills Development.

A History of Generic Skills Research

The literature is rich with generic skills research documentation, most of the Canadian research and development having taken place during the 1970's (and much of this at the Canada Manpower and Immigration's Training, Research and Development Station at Prince Albert, Saskatchewan). (e.g., Conger, 1973; Smith, 1974, 1975, 1977).

Manpower planners were looking for efficient ways of streamlining Adult Basic Education. It seemed a natural progression from a growing interest in behavioural objectives research. In turn, this generic skills research provided the potential for occupational clustering and, ultimately, guidelines for trainers with a view to maximum transferability of skills from occupations in little demand to those in most need.

Smith provided a definition of generic skills that has been adopted by researchers in the area in Canada and abroad:

> Those job behaviours which are actively used in work performance, which are transferable from one job or occupation to another and which are needed for promotion to the supervisory status.
>
> ...[The generic approach is to] examine the commonality of skills rather than the uniqueness of occupations. (Smith, 1973)

Some examples of generic skills follow:

Mathematics skills	multiplying whole numbers; solving single variable algebraic equations; adding fractions.
Communication skills	recording data on forms; reading to determine job requirements; writing to explain an operation.
Reasoning skills	diagnosing problems; scheduling work; making decisions.
Interpersonal skills	using attending behaviours; giving instructions.
Manipulative skills	using proper body posture for lifting and carrying; using hand-eye co-ordination.

The training station in Prince Albert began in the late 1960s as a joint federal/provincial program called New Start Projects under the direction of the Department of Regional Economic Expansion (DREE). To maintain independence, this New Start Program was set up as a corporation, and it included six provinces (Nova Scotia, New Brunswick, Prince Edward Island, Manitoba, Alberta, and Saskatchewan). The task was to address adult education, the success of which was being questioned in terms of low employability of graduates and suspected irrelevance of adult courses and programs. The mandate was for four years, but extended to five as interest grew nationally.

In 1972, Manpower and Immigration took an interest in and took over the project from DREE, and the Training Development and Research Station came into being. This station communicated publicly through Information Canada. For the next five years much of its research dealt with generic skills and national interest grew as Manpower-sponsored programs became more involved in upgrading and skill training in communities across the country.

From 1973 through 1976, principally under the guidance of Arthur Smith, four surveys were conducted in a variety of occupations, interviewing and observing workers and supervisors. A classification system of possible generic skills was identified through analysis and synthesis of training curricula, occupational analysis, Canadian Classification and Dictionary of Occupations (CCDO), and other relevant literature. With this taxonomy of skills and lists of skills actually used in the survey occupations, attempts were made to identify occupational clusters with a view to developing prescriptive training modules. In practical terms, this would allow the identification of existing skills the adult learner might already possess, "bottom line" skills required for entry into a desired occupation, and skills required for career advancement. The four skill areas originally examined consisted of Communications, Mathematics, Science, and Reasoning.

In a pamphlet entitled Generic Skills: Keys to Job Performance, Employment and Immigration Canada (previously called Manpower and Immigration), Smith concludes the following about each of the skill areas:

GENERIC COMMUNICATION SKILLS: "The ability to communicate effectively is probably one of the most significant reasons why some workers are selected and promoted to supervisory status."

GENERIC MATHEMATICS SKILLS: "Mathematical competencies are not generally greater requirements in the foreman/supervisory positions and are probably NOT a significant reason why some workers are selected and promoted to supervisory status."

GENERIC SCIENCE SKILLS: "Science skill and knowledge is probably NOT a significant reason why some workers are selected and promoted to supervisory status."

GENERIC REASONING SKILLS: "Supervisors and foremen responded very heavily to all these reasoning behaviours. It is considered that workers who display clear logical thinking abilities are likely to be selected and promoted to supervisory status."

In 1976 the Training Development and Research Station closed in Prince Albert as a result of a re-structuring of the Federal Government's Employment and Immigration Department. The research moved to the Ottawa area incorporated within the Advanced Development Division of the Occupational and Career Analysis and Development Branch at Canada Employment and Immigration Commission (CEIC).

The focus of Generic Skills research shifted to the tool skills in a survey of 588 tool skills from 1600 workers and supervisors in 131 occupations. The emphasis was upon maximum transferability of skills among trade areas. Publications, though still making recommendations for the adult learner, directed some attention to secondary school programs, especially technical training and career counselling.

In the pamphlet entitled Secondary School Vocational Model for Craft Trades, Smith (1979) and his associates within CEIC noted that high school technical students are expected to select an occupation before learning the occupational skills. The sequence is as follows:

The student

- first decides to take an occupational skill program;
- then selects an occupation;
- then learns/acquires the occupational skills;
- then graduates and looks for a job in the selected occupation.

Smith suggested, instead, a sequence that would have the student learn those skills extensively used by most craft trades before making occupational decisions. Next the student would make a broad occupational family selection and finally narrow single occupational decisions. The sequence would then look like the following:

The student

- decides to take a vocational trades program;
- learns tool skills used in a variety of occupations;
- selects an occupational family;
- then learns tool skills used in a family of occupations;
- then selects an occupation;
- learns specialized occupational skills;
- graduates and looks for a job in selected occupation or in other trades in the same occupational family.

For example, the generic skills research showed that the Automotive Machinist and the Maintenance Machinist have a high percentage of skills in common with the mechanics trades.

However, these two trades are usually classified with the machinist trade. Conversely, the Body Repairer, Instrument Repairer, and Office Machine Repairer, who are usually classified with mechanics, actually share more skills with other trade families. Jobs, then, fall into families if their generic skills overlap to a high degree according to job task analysis.

Smith's model provides a hierarchy of skills, from those most frequently used in the craft trades to the less frequently used skills, along with an indication of the extent to which these skills are used by workers in 24 different occupational groups. This model is useful in sequencing technical courses. Furthermore, it provides more rather than less flexibility to students in making choices, where career decisions are made at two stages during their schooling and transferability of skills is emphasized.

The data suggests then, that rather than offering specific programs such as Motor Vehicle Mechanics in secondary school, it might be more appropriate to offer generalist programs, such as Mechanical Servicing, such programs having a much wider array of potential jobs upon completion. Thus the student could defer the specific career decision to a later date. Moreover, the secondary school could promote career exploration in the early years.

For example, a student who makes a choice in Grade 9 or 10 to take some technical training, might follow a sequence of decisions and training such as the one identified below:

GRADES 9 & 10	GRADES 11 & 12		GOALS
Student decides to take technical training and in an exploratory shop(s); learns and practises the care and use of those tools and equipment (with associated safe practices) which are common requirements across nearly all trades	Student selects Occupational Family e.g., Machining	Student selects more specific courses, e.g., Drafting, Electricity, etc.	Draftsperson Electrician Radio/TV Rep Med. Lab Tech (These all have a high percentage of skills in common.)

In Smith's and other models (Randhawa, 1978), certain "core skills" can be identified for a variety of occupational families, including business-oriented occupations as well as technical trades.

Generic Skills Research in the 1980s

As Generic Skills research developed through the 70s, coincidental confederates could be found among "life long learning" proponents and futurists who saw a generation of the 80s and 90s graduates needing the skills to accommodate several career changes within their working lives.

Those involved in the original research in Prince Albert were called upon by the research team in late 1984 to reflect on the Generic Skills body of research, evaluate it with the advantage of hindsight, and place it into today's work force and educational context. Arthur Smith observed that, although the original generic skills approach assumed individualized

instruction and was typically directed toward the adult learner at the BTSD level (Basic Training in Skill Development), the body of work did and still can provide guidance to secondary school educators and counsellors.

He cautioned that much of the current generic skills training was making a fundamental error in failing to concentrate on the "what", leaving the "how" to the teacher. He stressed that the teacher should maintain control of the process. Smith saw the potential for a generic skills awareness in assisting secondary school course clustering, even though individualized instruction is not generally the most common teaching/learning pattern, and within the framework of existing course structures.

But although Employment and Immigration Canada has undoubtedly benefited from its experience with generic skills research, this approach is no longer a strong influence on either training plans, manpower projection schemes, or job placement mechanisms. With the training emphasis shifting to higher skill level training (i.e., away from BTSD) and a higher skilled unemployed population, generic skills has become merely a foundation for further research and development, particularly in the area of occupational family groupings.

The Occupational and Career Analysis and Development Branch of Employment and Immigration, Canada, has discounted the usefulness of the generic skills approach because of the lack of acceptance by the secondary school and community college institutional personnel. Since this approach was suited for being delivered in training modules and ideally on an individualized basis, the implementation of this approach would require that the curricula be completely revamped to fit into a new structure, different from courses, and a new delivery system.

Holland College in Prince Edward Island has, since the mid-1970s, re-aligned its training programs, using the occupational framework called DACUM (Designing a Curriculum), conceptualized by DREE in 1969. Modularized, competency-based packages have been developed to allow an adult learner to progress at his/her own rate through a training program. Cognitive, affective, and psychomotor skills of each program were identified so that job entry skills could be learned in a sequential and cumulative manner; courses were abolished; and an extensive evaluation system was developed. The (then) Manpower and Immigration Training Division offered Training Improvement grants (TIP) under the Adult Occupational Training Act to encourage other colleges throughout Canada to follow suit. Programs were suspended for one to two years while such revisions took place. Federal funds accumulated to approximately 2.5 million dollars for that development from 1975 to 1978. But, although other provinces and colleges followed suit initially, the DACUM approach to learning fell flat in its implementation stage. Its failure was attributed to the difficulty in making the transition to competency-based learning packages. Although it was, in theory, an excellent approach to training, in practice it was not accepted.

Now that same branch of CEIC's Training Division is in the midst of developing a new National Occupational Classification system and a related data base of occupational skills and experience known as Jobscan, to replace the Canadian Classification and Dictionary of Occupations, 1971 (CCDO). Those officials recommend that occupations be grouped into families

based on observed patterns of occupational mobility and characteristic career progression. Consequently, with their memories of the general lack of acceptance of the generic skills approach and the realization that workers are involved in tasks which are more easily understood within the world of work than job competencies, they have changed their thrust in order to more efficiently and effectively match a job seeker with a vacant job. The Jobscan group must first identify the tasks of the thirty-six main occupational units (i.e., an occupational family), using like and common terms. Then, using computer technology, a job seeker eventually will be able to specify each task that he or she is capable of and be matched with an unfilled job that is listed in the on-line data base.

Similarly, in the Maritime provinces, and particularly in Nova Scotia, there is a movement away from the "pure" generic skills approach and from adult upgrading. Before, BTSD was viewed as a discrete pre-requisite for job training. Now attempts are being made to integrate these basic skills of literacy and numeracy into occupational training itself. This inclusion is perceived as making the training more relevant to those who undertake it, and hence motivating them. Efficiency as well as effectiveness remain as concerns.

B.C. on TRAC -- A New Vocational Training Plan

On January 4, 1983, British Columbia introduced its new continuous intake/exit, individualized, competency-based vocational training plan. It is called TRAC, which stands for Training Access, and was to replace existing pre-apprenticeship programs in British Columbia. An examination of existing programs revealed a commonality of subject matter in all pre-apprenticeship programs. A common core emerged as did six further subsets of common material. In a discussion of the new plan, Lorne Thompson said "the existence of a common core, feeding all occupational groupings, provides a student with the ability to enter training without having had to define a specific career choice. There exists maximum lateral movement during the introductory, remedial, exploratory stage" (Thompson, 1984, p. 58).

Occupational Families and the Job Components Inventory in Britain

Stafford, in a project conducted for the Manpower Services Commission in Britain, from 1981 to 1984, applied the occupational families' model to the youth labour market. A Job Components Inventory (JCI) was developed to define six clusters of occupational families (clerical, skilled interpersonal, operative, unskilled manual, intermediate skilled technician, and skilled technician). It is hoped that this approach will be used in designing programs to meet youth training needs in Britain.

Stafford and others, working out of the Medical Research Council at the University of Sheffield, found that the "bottom line" generic skills approach was too limiting for the Job Components Inventory. She observed that "Smith's approach to job analysis, through assessment of generic skills, differs from the other approaches in that it was developed from application in education and broadly based training .... However, the language and concepts of generic skills are sometimes rather complex and unsuited for our target population of young job-holders" (Stafford et. al., 1984, p. 142). In essence, the Jobscan developers within CEIC have come to a similar conclusion. The theory of generic skills is excellent; in practice, however, it is not found to be that useful.

The Job Components Inventory was constructed with certain specifications in mind:

(i) The language and concepts should be at the appropriate level for the target group of less qualified school leavers;

(ii) The inventory should be easily administered by trained interviewers, not necessarily professional job analysts.

(iii) The inventory should be comprehensive, but should not take too long to administer.

(iv) The skills included should be important for job performance in a wide range of occupations and should be of the kind that can be applied to curriculum development to training, and to careers guidance. (Banks, Jackson, & Stafford, 1981, p. 4)

From a sample of 455 jobs studied, 21 core skills were identified which appear to be fundamental to a wide range of jobs. These core skills are:

Telephone
Bend, stretch or reach
Finger, hand, wrist speed
Push, pull, or carry heavy objects
Manual dexterity
Steady arm or hand
Concentration - repetitive work
Use whole numbers
Add or subtract whole numbers
Use of length - imperial
Receive written information
Advise or help colleagues or workmates
Complete standard forms/letters
Use codes
Finger dexterity
Arm or leg co-ordination
Good sense of touch
Distinguish shades of colour
Responsibility not to cause death
Responsibility not to damage tools and equipment
Responsibility not to lose time

The resulting job clusters suggest the need for a common core curriculum covering those components identified as frequently occurring. Following this core, trainees would be divided into broad occupational groups corresponding to the clusters identified. For example, the content of training for clerical occupations would emphasize numeracy, decimals and percentages, reading and writing, and dealing with customers. The approach emphasizes training for a wide family of jobs rather than a narrow focus on preparation for one job. To best serve the target group with the JCI, it was thought that the 455 jobs studied should represent the kind of jobs typically entered by less qualified young people. Two groups (647 in total) of school leavers were followed into employment. The jobs they entered formed the basis of jobs studied for skill components.

The London into Work Development Project

Dr. Townsend and the Institute of Manpower Studies at the University of Sussex in Great Britain, conducted an analysis of attributes which experienced workers possess and which school-leavers lack. This analysis, carried out in 1981-82 and sponsored jointly by the Manpower Services Commission, Department of Education and Science, and the Inner London Education Authority, was called the London Into Work Development Project.

The results suggest that schools, in attempting to prepare young people for life outside the classroom, do not adequately attend to "certain skills which are at least as important as those on which schools have more traditionally concentrated." Furthermore, Townsend pointed out that employers' selection procedures "may not be adequately attuned to the content of jobs." In short, "the data indicate that certain numeracy and literary skills are less important than has hitherto been assumed, and that a number of oral communication, planning, and problem-solving skills are of key importance in many jobs" (Townsend, 1983, p. 1).

The ultimate aim was to create an analytical basis for training schemes for young people. Economic factors demanded two caveats: that the number and availability of jobs is limited; and that workers with good initial training in a range of related vocations are more likely to be valued by employers. Townsend concluded, as did others who seek efficient (in terms of time and money) training, that training schemes with a core of "generic skills", would be best equipped to provide the broad-based training needed. The "occupational families" training approach, rather than job-specific training appears more appropriate.

Townsend developed a job-profiling questionnaire, the aim of which was to divide the content of a job into these seven main skill areas.

(i)	Basic Calculations	(v)	Listening and Talking
(ii)	Measurement and Drawing	(vi)	Manipulative
(iii)	Reading	(vii)	Planning and Problem
(iv)	Writing		Solving.

After one year, 1000 profiles had been developed. The seven skill areas were then ranked by skills occurring in 50% or more of jobs. The results were as follows:

Skill Group	'Genuine Ranking'
Listening and Talking	1
Reading	2
Planning and Problem Solving	3
Writing	4
Basic Calculations	5
Manipulative	6
Measurement and Drawing	7

Of these results Townsend (1983, p. 3) notes, "Given the bias in employers' selection procedures towards reading, writing and arithmetic, these results are, perhaps, unexpected. It may be that employers' expectations of competence are highest for those skills traditionally associated with school." This comment is consistent with the findings of Hall and Carlton (1977), based upon their research on one Ontario community. They, too, learned that employers were quick to criticize the employees' competence in mathematics (despite the fact that only the most basic of numeracy skills are being used in the workplace) and that employers were even more critical about their employees' communications skills. They attributed blame for their employees' inadequacies to the secondary school system.

Our interviews with the Registrar/Admissions Officers and Heads of the Business, Health Science, and Technological Departments in ten Ontario community colleges resulted in similar findings. They indicated that incoming students were ill prepared in communication, basic mathematics, and problem-solving skills and abilities. However, they could not be more specific as to the generic skills nested within these umbrella terms. When probed further, however, they focused on the lack of problem-solving skills -- identifying the inadequate competencies as comprehending written materials, generating viable alternatives, selecting a realistic solution, and then being prepared to take the responsibility for their actions. Moreover, the college officials spoke of students' lack of abstract thinking and their inability to recognize similarities between problems in a variety of situations.

The generic skills associated with problem-solving ability are included in the majority of the existing and newly-developed Ministry of Education curriculum guidelines. One can only surmise at this point as to why the students are perceived as being unable to comprehend or apply their knowledge. Certainly this is not the first time that educators have expressed concern with the seemingly rote learning and subsequently blind application of problem-solving algorithms. Perhaps the emphasis in the classroom has been on the carrying out of a strategy, rather than on determining how appropriate is a solution, i.e., the reasonableness of the result (through verification or estimation), and then generalizing the solution to a similar problem in another context.

Other than the above comments, though, college personnel were unable to identify the generic skills required as entrance requirements to ensure success in a college program. They continuously referred back to courses in the secondary school which they have deemed essential. For example, a study undertaken by the Ministry of Colleges and Universities in the mid-1970s indicated that secondary school grades remained the best predictor of academic success in the nursing program, to include a minimum of four senior level advanced science and mathematics courses and senior level advanced English (Weinstein, et al., 1976). Also, the Heads of Technology of the Ontario CAATs recommended to their Committee of Presidents, in June 1984, that entrance requirements to all college technical and technological programs consist of SSGD (now the OSSD) and include two senior level technological mathematics courses, an applied chemistry course, an applied physics course, and a technological science course. The specific competencies, then, have long been forgotten or overlooked. They have geared their programs based on secondary school courses, as input. As output, they continue to look to the standards required for the occupation as specified by legislation (e.g., provincial or inter-provincial licensing examinations), by their college program advisory committees, and by the General Educational Development and the Specific Vocational Preparation ratings which are listed in the CCDO.

When questioned about the merits of training for a specific career or a family of occupations, the college officials all recognized the benefits of the latter approach. Indeed, many of the programs in the first semester had similar core curricula and they encouraged the students' exploration of different career routes in that family. In doing so, they acknowledged that the students could transfer more easily into another program within that family of occupations rather than having to withdraw from the college and re-enter at a later date. Particularly for smaller colleges and for programs in the technological areas

which are frequently under-subscribed, they confirmed that training for a family of occupations was more efficient.

Indeed, discussions with individuals in the Ministry of Colleges and Universities and the Ministry of Skills Development have revealed that this clustering of a common core is being considered among, as well as within, families of occupations. The core curriculum would be developed around the knowledge, skills, and abilities necessary for entry into the workforce, crossing the traditional business, health science, and technological lines. If this re-organization occurs within the colleges, the students will be able to investigate a broad spectrum of career paths and postpone specific career selection until somewhat later.

Implications of Generic Skills Research for Secondary School Planners

Youth unemployment is now an international concern. The consensus is that viewing occupations in families or clusters is realistic and prudent for everyone involved in training. Generic skills research has provided a foundation upon which occupations can be grouped. Furthermore, the research has given insight into the transferability of skills from one job to another. This framework is now being applied to the studies related to improve the quality of work, job enrichment, and/or job rotation even within the Ontario Government. An occupational family consists of a group of occupations. At face value, the group might not appear to be closely related. The justification for grouping them, however, is that the competencies required for the performance of those occupations overlap. Job task analysis results are available from a variety of sources to outline these overlaps.

However, secondary schools must respect exploratory and broad educational goals. It is true that an examination of the feasibility of school-based "career-oriented" packages within Ontario secondary schools must consider the generic skills body of work, and can benefit from the resulting occupational families identified. In the secondary school setting, we are dealing with a dynamic career counselling process embedded within the course sequencing itself. We require, and can use, the broad umbrella guidance that the generic skills body of work provides.

Secondary school educators face at least three dilemmas with respect to students and what happens to them when they leave secondary school:

1. GENERAL EDUCATION versus JOB OR POST-SECONDARY SCHOOL PREPARATION

   Where is the compromise position between recognizing the exploratory nature of the adolescent experience and the provision of guidance into the practicalities of the world of work?

2. PROVISION OF "PAPER" CREDENTIALS versus SKILLS THAT WILL ACTUALLY BE USED ON THE JOB

   How do educators deal with the fact that employers, while demanding certain paper credentials, actually do not make use of more than a fraction of the skills suggested by those qualifications?

3. SEQUENCING OF COURSES versus FLEXIBILITY

Recognizing that the employer values an employee whose training is not totally job-specific, how does one maintain a balance between flexibility of options and some measure of continuity?

It is these types of antithetical questions that we as educators are addressing.

In summary, course sequencing can provide more flexibility for career choice to the secondary school graduate (or the early leaver, for that matter) if the process is well planned. It has been well documented that training for specific occupations is not advisable at the secondary level, for a variety of reasons (Hall & Carlton, 1977; King & Hughes, 1985). It is wise to maintain a reasonably wide range of options for secondary school students during their secondary school training, because specific skill training at entry level jobs is best done on-the-job, and labour force needs are constantly changing. It seems prudent, then, to view career perspectives of these students in terms of occupational families, of allowing students to make career decisions in a two-step manner over their secondary school years (Smith, 1977; Thompson, 1983). This perspective acknowledges both the career exploration requirements of the early years of secondary school and the narrowing of a student's focus in the senior years.

Competencies required in occupational families have been well analysed and are now available in the literature. These competencies are identified as objectives for students to acquire, but these competencies have been embedded within a structure of secondary school courses. To attempt to implement the specification and use of generic skills as Arthur Smith proposed within the secondary school system would require a substantial shift for educators at both the secondary and post-secondary levels. Its lack of acceptance at the national college level, however, has considerably reduced its chance of success within the educational community of Ontario. To use the structure which currently exists to identify school-related packages leading to preparation for occupational families would appear more practical and easier to implement. OS:IS allows for course pre-requisites and co-requisites to be identified within the schools. Hence, these packages would entail a collection of courses (sequential and concurrent) leading to a family of occupations. Neither the existing content or delivery systems would require substantial change. Students should continue to be encouraged to take courses in communications and particularly in the mathematics and sciences in addition to those mandatory requirements of OS:IS. Moreover, they will require problem-solving skills for any occupation. An integrated approach to the application of problem-solving across the curriculum is necessary. In all, such is the intent of the school-related packages that will be developed as part of this research activity.

III. FUNDAMENTAL PRINCIPLES

Introduction

As a direct result of the preliminary work to investigate the generic skills approach, a list of principles was compiled to underline the development of relevant secondary school-related packages. Again, the packages are intended primarily as a guidance tool, to help direct the students' entry into post-secondary education or training and the work force.

The principles were intended to direct the design of the packages and, in addition, to help us focus on the issues of gaps and overlaps that may occur in a student's learning at the interface of the secondary school and the community college or workplace. Following the data collection and analysis (included in the two subsequent sections of this report -- Parts IV and V), the principles were further refined to reflect the findings and were then incorporated within the revised design of the school-related packages.

The (revised) principles are listed here in order to provide the framework for the rest of the report.

The Principles

1. The aim is to offer the student a program which will direct him/her toward a family of occupations rather than to a specific career choice or vocation. This principle offers a reasonable compromise between the dichotomous goals of our educational system: a general education vis-à-vis specific career preparation.

2. Since current Ministry of Education curriculum guidelines incorporate within the secondary school courses the basic competencies required as preparation for the families of occupations, these courses will be used as the components of the "packages" that are developed. A package, then, will consist of sequences and/or combinations of courses directed toward a broad family of occupations.

3. Grades 9 and 10 are deemed as career exploration years for a student as well as providing the opportunity to complete a number of the compulsory courses. Grades 11 and 12 will provide more specific opportunities for career preparation, in line with the family of occupations orientation, and include the completion of the 16 compulsory courses and the 30 total course requirements of OS:IS.

4. The aim of the packages is to provide the student with flexibility in a variety of ways:

   a) The student can delay his/her decision regarding a career path.
   b) The number of courses in a package should not be so great as to require a significant amount of back-tracking by a student in terms of making-up necessary courses if a change in career plans takes place.
   c) The sequencing of courses should allow students, once they have decided on a family of occupations, to shift to a second or third choice within the family with a minimal loss of time in the secondary school -- a progressive, rather than a regressive movement.

The concept of having a goal and continuously moving toward that goal throughout secondary school should help to motivate students to complete secondary school and maintain their self-esteem, despite the increased number of credits and mandatory credits outlined in OS:IS.

5. The packages will encourage students to retain Mathematics and Science into their senior school years, in addition to English. The inclusion of these core subjects will allow the students the maximum amount of choice when:

   a) selecting a family of occupations,
   b) choosing a career, and/or
   c) re-training for an alternate career.

6. The packages will include the courses which will not only direct the student to families of occupations, but also reflect the slant of the student's program. This slant or focus is reflected in an endorsement on the student's transcript in the Business or Technological areas if eight courses in that program are successfully completed. Again, this is designed to positively reward the student, and hence act as a motivating device.

7. These packages, including some documentation on how to work through these sequences and/or combinations, may provide the basis of a resource document for secondary school students, parents, teachers, and counsellors alike.

The packages will include two groups of courses. The first group, identified as RECOMMENDED CORE COURSES, will prepare students for a specific family of occupations (including those that require a college diploma). This group will normally include some courses that are mandatory within OS:IS and these will be so indicated. In addition, these courses may require certain courses as pre-requisites and as co-requisites. Such interconnections will be highlighted. Furthermore, some courses will be listed as one or two credits. This inclusion will allow for the disparity existing in the Ontario secondary schools (e.g., Exploratory Shop consisting of components such as Electricity, Construction, Mechanics, Blueprint Reading is offered in about half the schools as one course, and in the remaining as two courses). On occasion, a choice in a subject area is offered (e.g., two of three Science courses), but the preferences will usually be specified. As well, where the

course names and codes do not reflect the level of difficulty, a student can choose a course at either the General or Advanced level. It should be recognized, however, that General-level courses are not less than Advanced-level courses; rather, General-level courses are different from Advanced-level courses. This distinction is reflected in the course titles, course codings, course descriptions, and co- and pre-requisites.

A second group of courses, identified as SUGGESTED SUPPORT COURSES, are offered to help the students choose what other courses they should take if their timetable permits and if these courses are available within a particular school. For example, a student interested in an Environmental Technology occupation, should be encouraged to take the Environmental Science course (SEN) if the school offers it. In following the recommendations of OS:IS, the work experience offered through the Co-operative Education route should similarly be encouraged, but with the understanding that it may not be feasible in every school in every community for every occupation. Also, as many of the occupations will be using computer technology within the next few years, students are encouraged to supplement their programs, if at all possible, with at least one computer course. As some of these courses also satisfy the 16-mandatory subject requirement of OS:IS, they would be noted as doing so. In all, this group of courses is supportive of the core courses listed in the previous grouping. And, for the group of work-bound students, the suggested support courses are strongly recommended in order to help the graduates obtain related employment.

The objective is to assist the student in both his/her successful secondary school completion and career preparation, and still recognize the student's individual interests and the facilities available within a school and a school board.

8. Each package will also include consideration of both the direct and indirect routes available to a student:

   a) from school (OSSD) to direct entry into the labour force;
   b) from school (OSSD) to entry into a post-secondary program;
   c) dropping out of school prior to OSSD completion and entering into the labour force and/or re-entry into the secondary school or a career preparation make-up program and entry into post-secondary preparatory programs;
   d) aiming for one specific occupation and then changing the focus to another occupation within a family(ies) of occupations;
   e) reinforcing the notion of life-long learning in similar or different career paths that are available to a student;
   f) reinforcing the notion that circumstances may require that an individual go into retraining or into a more specific career. In the Health Assisting occupational family, for example, a student may enter into the work force as a dental assistant, but then later move toward a career in dental hygiene.

   Flexibility in career choice, rather than narrow and restrictive programming, underlies all these above choices.

9. These packages will be incorporated into a resource document that will provide guidance counsellors with information that can be used in interviews with the secondary school drop-out. The packages will show re-entry routes into occupations after a period of time out of school and entry routes into additional careers. The alternative routes for early school leavers should offer them some direction in their work plans. Again, this procedure reinforces the basic notion of a continuous school-work-school-work cycle.

10. These packages will introduce the students to the program admissions' requirements of the CAATs at an early stage in their secondary school program.

Summary

The development of the school-related packages appears to be feasible, based upon these ten principles. But these packages must be consistent with several aspects, which together comprise the school-to-work interface. Those aspects are: one, the Ministry of Education objectives as stipulated within OS:IS and carried out within the curriculum guidelines; two, the secondary school course structure; three, the community college program entrance requirements; and four, the direct work entry requirements.

The development and use of such school-related packages across the province should help to clarify career goals for the students or drop-outs, and should also help both the colleges and the employers in their selection/hiring decisions of the secondary school graduates.

IV. ANALYSIS OF SECONDARY SCHOOL DATA

Overview

In this section we summarize our findings of the analysis of secondary school curricula in our efforts to begin to develop some school-related packages, following those principles which were outlined in the previous section. In brief, the SERP, ROSE, and OS:IS documents were studied in detail and Ministry of Education officials were contacted to provide the background and context for the Ministry policy recommendations for the development of school-related packages, as documented in Sections 5.9, 5.10, and 5.11 of OS:IS. Then, Ministry curriculum guidelines, many of which are still in the developmental or review process, were obtained and analyzed for course content and basic competencies. Information on these guidelines which are not yet available in even a draft form was obtained from members of the writing teams and/or Ministry of Education officials. And third, two large samples of secondary school calendars were obtained for the 1984-85 and the 1985-86 school years in order to determine the types of school-related packages and sequences which are being developed within school boards and/or schools. Information from all these sources collectively resulted in a preliminary set of school-related packages which were vetted by a few secondary school teachers and by a larger sample of community college personnel. Those responses are recorded in detail in Part V of this report. The remainder of this section, however, includes our specific findings on the implementation of sections 5.9, 5.10, 5.11 in OS:IS within the Ontario secondary schools.

Methodology

In October 1984 and then again in February 1985, a letter was sent out to one of every three secondary schools in Ontario requesting any information on their school-related packages (as per Sections 5.9, 5.10, and 5.11 of OS:IS), as well as a copy of the school calendar. (See Appendix A for a copy of that letter.) The schools were selectively sampled within each school board to ensure that schools both large and small, urban and rural, and comprehensive and vocational were equally represented. The first mailing went out to 219 schools; the second to 221 schools. The schools from the first mailing had, on the average, 60 teachers and 979 students. The second mailing included schools which had, on average, 60 teachers and 955 students. These data were obtained from the 1983-84 and the 1984-85 Directories of School Boards.

The second mailing was undertaken for several reasons. Because OS:IS was in its first year of implementation in 1984-85, schools did not have much time to prepare any course or program sequencing for calendar inclusion. Other concerns, listed within 4.15 of OS:IS regarding the revisions to the school course calendars, were deemed to have a higher priority. Also, as the mailing occurred late, some school calendars were either unavailable or in the process of undergoing further revisions. Subsequently, we contacted a second group of schools in February 1985 for that same information. We anticipated, and found to be the case, that the majority of the school calendars would have just undergone revision for the 1985-86 school year.

In all, the response to the request for information was excellent, far exceeding our expectations. Approximately 155 1984-85 calendars were returned with our first mailing; over 185 calendars have been received to date from the second mailing. Five additional 1985-86 calendars have been received from the first mailing. Calendars are still being received, but on a sporadic basis from both mailings. The rate of return was 71% from the first mailing and 84% from the second mailing, with an aggregate rate of return of 77%. Several of the respondents, either principals or counsellors, expressed an interest in this project and indicated that our work would be of value to them in the counselling of students towards successful occupational goal attainment.

The Findings

In general, the analysis indicated that the majority of the 18 topics listed in Section 4.15 of OS:IS were included in the 1984-85 calendars. However, the description of available community and school-related packages was minimal. Moreover, although it was evident that some attempt had been made to adjust the courses to meet the standardized course coding requirement as listed in the Ministry of Education document entitled Ontario Student Transcript. Common Course Coding, many inaccuracies appeared. These could be attributed to insufficient time prior to the publication of the 1984-85 calendars or a lack of detailed information.

Of those 1984-85 and 1985-86 calendars analyzed, the following observations have been made:

1. In the past, school calendars have varied considerably in format and content. While calendars still demonstrate a variation in format, their content is far more standardized, and incorporate most of the items listed in Section 4.15 of OS:IS. However, information was noticeably missing on community and school-related packages and endorsements on students' transcripts. Moreover, in those calendars which mentioned packages, a majority included only a brief statement of their intent.

Although OS:IS appears to have contributed to greater calendar standardization, we found that:

a) specific information in the calendar was difficult to locate, e.g., semestering and endorsements;

b) the language used would often not be readily understood by its audience; and

c) the text was found to contain grammar, spelling, and coding errors, as well as being internally inconsistent in numerous instances.

2. A number of school boards (large and small) such as Etobicoke, Peel, Toronto, Hamilton, York, Niagara South, and Norfolk have produced board calendars which document the information for all their secondary schools. Some publicize the diversity of programs that exist within the boards, and the opportunities to specialize within each secondary school. This approach is consistent with OS:IS. Others, the majority, just list the courses available at each school, either on a separate sheet for each school or one sheet for all schools. Courses, rather than programs, appear to be the focus of those calendars. A second group of secondary school calendars are similar in format and structure within a board, such as the North York Board. However, the majority of calendars are still unique to each school within a board.

3. An attempt was made to determine if there was a trend towards more semestered schools. Of the 1985-86 calendars received, 93 or 50% of the calendars indicated that semestering occurred. Seven of those calendars mentioned that semestering would start in September 1985; but information on how the school was organized was not available from 15 of the sampled schools. Nevertheless, we would conclude that the number of semestered schools is increasing in order to provide greater flexibility of course offerings which OS:IS recommends to enable students to complete the 30-credit requirement in four or four and one-half years.

4. Schools are becoming much more prescriptive in specifying the number and the types of courses to be taken. Most schools advocate that 8 courses be taken in each of the Intermediate years, and a minimum of 7 in the two Senior years.

This trend is particularly evident in Grades 9 and 10, where the majority of the 16 mandatory credits are "strongly recommended" to be completed. Over 54% of the schools explicitly outlined the courses to be taken in these two grades. The following are examples of such prescription:

Example 1:

The Grade 9 student must enroll in the following 6 courses (5 at the Basic level):

ENGLISH	ENG 1B/G/A
FRENCH	FSF 1B/G/A
GEOGRAPHY	GCA 1B/G/A
MATHEMATICS	MAT 1B/G/A
PHYSICAL & HEALTH EDUCATION	PHM/F 1B/G
SCIENCE	SEN 1G/SPH 1A

In addition, the student selects 2 other courses from the following (3 at the Basic level):

ARTS	ADA 1G (dramatic arts) or AMU 1G (music) or AVI 1B/G (visual arts)
TYPING	BKT 1G
FAMILY STUDIES	NFN 1G
TECHNOLOGICAL STUDIES	(A range of 4 1-credit & 5 1/2-credit courses)

The Grade 10 student must enroll in the 4 following courses (3 at the Basic level):

ENGLISH	ENG 2B/G/A
HISTORY	HCC 2G/A
MATHEMATICS	MAT 2B/G/A
SCIENCE	SEN 2G/SBI 2A

In addition, the student selects 4 other courses from the following (5 courses at the Basic level):

ARTS	ADA 2G (dramatic arts) or AMU 2G (music) or AVI 2B/G (visual arts)
TYPING	BKT 2G
COMPUTER STUDIES	DIC 2G
FAMILY STUDIES	NFC 2G
FRENCH	FSF 2B/G/A
PHYSICAL & HEALTH EDUCATION	PHM/F 2B/G
TECHNOLOGICAL STUDIES	(A range of 4 1-credit or 5 1/2-credit courses)

While this procedure does ensure that the majority of the mandatory OSSD credits are taken by the end of Grade 10, it does reduce students' choice. However, it is not as restrictive as the following "other" courses offered in this second example, below:

Example 2:

Grade 9	Grade 10
1 ENGLISH	1 ENGLISH
1 MATHEMATICS	1 MATHEMATICS
1 SCIENCE	1 SCIENCE (PHYSICAL SCIENCE)
1 PHYSICAL & HEALTH EDUCATION	1 HISTORY
1 FRENCH	1 GEOGRAPHY

Plus, in Grades 9 or 10:

1 ART, DRAMATIC ARTS, OR MUSIC

1 BUSINESS OR TECHNOLOGICAL STUDIES

Plus, 1 MORE

What appears to be occurring, moreover, is that the majority of schools have chosen not to offer courses at two or three levels when replacing their open-phased courses. In comparing calendars from one year to the next, we have found that the majority of open-phased courses have been reclassified as General-level courses. But this was not the Ministry intention and could have the same effect on students who take mainly General-level courses as was the case in the past. That is, students who take mainly Advanced-level courses are enrolled in the same courses as those who take mainly General-level courses. The former group are far more likely to be successful; the latter group are more likely to experience high failure rates. Courses only offered at the General-level were found in the calendars in virtually every curricular area, and particularly in the Arts and the Family Studies areas.

5. The above prescription is juxtaposed with the high variation of offerings within Technological Studies from school to school. Over 60% of the schools which offer Technological Studies encouraged students to explore this field in Grades 9 and 10 by offering one-half or one-quarter credits within the exploratory (TIE) courses. Some restricted exploration to a family of occupations (e.g., a construction trades package or a mechanical trades package), while others allowed partial credits to be earned in any technology course (a maximum which we found to be nine). One-half or one-quarter credit courses were not found in any other subject area, even in the Business Studies.

6. Virtually all schools now have stipulated course prerequisites. Very few have included co-requisites (other than Mathematics for Chemistry and Physics). Yet OS:IS advocates that both be used, in part for the purpose of developing community and school-related program packages. Furthermore, where packages have been developed, they are predominantly in Business Studies and/or Technological Studies, as evidenced in 35% of the calendars. Only 6% of the calendars indicated any inter-subject sequencing, i.e., what has been defined by the Ministry as school-related packages. Although the explicit intention of OS:IS was to encourage learning and hence the reinforcement of competencies across the curriculum through the development of program packages, the term "program" appears to have been understood as intra-subject sequences, rather than inter- and intra-subject course combinations and sequences. Furthermore, five of the school principals expressed an interest in the outcome of this research and said that they would appreciate copies of school-related packages. Hence, there does appear to be a need for an external impetus such as this research project to facilitate in-house development of such packages.

7. Although the 1985-86 calendars indicated a slight upward trend to include school-related packages, the converse was noted with respect to endorsements on students' transcripts. Very few calendars stated that if a student took eight courses in Business or Technological Studies, an endorsement would be indicated on the student's transcript. The analysis of these calendars revealed that references to endorsements were vague, ambiguous, contrary to OS:IS recommendations, and that substantial differences existed as to what courses constitute the eight-credit requirement. Excerpts from two school calendars illustrate the inconsistencies.

One calendar stated:

> Endorsement in a Technical field requires two technical credits in a major subject and a single related technical credit in each of grade 11 and 12 (3 credits), plus one credit in each year in each of English, Mathematics and Science. Up to two of these credits may be earned through Co-operative Education.
>
> Endorsement in one of the Business Education fields requires a credit in each of grade 11 and 12 English, and in grade 11 and 12 Academic Math or Business Machine Applications--plus six additional credits in various combinations of senior business subjects. Endorsement is offered in each of: Accounting, Marketing, Stenography and General Business. Up to two of these credits may be earned through Co-operative Education.

Compare that with another calendar which stated:

> Business Education Majors:
> Students may obtain an endorsation in the following majors: Business, Clerical and Secretarial. Those who propose to take the required eight subjects for these majors are strongly urged to discuss their plans with any Business Education teachers.
>
> Technology Majors: Requirements--
>
> The combinations of Technology majors which may be offered are:
>
> a) Six technology credits including a prerequisite and two senior credits.
> b) Two senior Mathematics credits (Year 3 & 4)
> c) Physics or Chemistry (Year 3 or 4).

Not only is there a noticeable lack of information in the school calendars about endorsements, but there appears to be a lack of basic understanding (or a misunderstanding) about which eight courses constitute an endorsement (i.e., solely Business/Technological Studies' courses OR solely Senior Business/Technological Studies' courses OR courses specifically designed for or oriented toward a Business/Technological program).

8. In attempting to develop some school-related packages, we used the Ministry guidelines, the coding manual, course enrollment data, and the course calendars in order to ensure that only the most appropriate and the more commonly used courses were included in the packages. Although more of the calendars are now including the new course codes, it was difficult to match up the school information with that of the Ministry. In some boards, for example, course coding is standardized across schools; in others variations exist from school to school. Evidence from a few boards, such as Hamilton, indicate that this codification has not been an easy task. The problems can be seen in comparing calendars with each other -- course descriptions differ even though the codes applied to them are the same, codes and course descriptions refer to courses where there are no Ministry guidelines at the present time, often the Ministry guidelines and coding manual use different codes for the same course titles, and courses and codes are found to be either specified or sequenced inaccurately within the same calendar.

9. Other roadblocks were encountered in the development of the school-related packages, such as:

a) The constraints imposed by the 16-mandatory course OSSD requirement and the 8-course Endorsement requirement appear to be met by a trend shown in the guidelines, coding manual, and calendars to double-code some subjects, e.g., Math for Business (BTB/MTB), Business English (BBS/EBS), and the four Data Processing courses -- Applications (BPA/DPA), Concepts (BBC/DPC), Systems Analysis and Design (BPS/DPS), and Techniques (BPT/DPT). Yet this pattern has not been carried over into Technological Studies with any consistency. The courses, although designed for that area but neither coded nor described in any of its guidelines to

date, are: Math for Technology (MTC), Technological science (STE), and Computer Science and Technology (DST). On the other hand, Computer Technology is both described and double-coded as DEC and TEC, under Computer Studies and Technological Studies.

b) The Business English course (BBS/EBS) has been included in 25% of the 1985-86 calendars, despite the fact that its guidelines are only in the draft stage. Only two of those forty-six calendars identify it as a Grade 11 course; the remaining calendars stipulate it as requiring at least three prior English courses. Several refer to it as an appropriate fifth English course, particularly for those students graduating without OACs, i.e., for those work and/or college-bound students.

c) The final major area of ambiguity identified in our analysis of Ministry documents and school calendars was the Senior Social Science requirement. Although the OS:IS document (Appendix B, page 39) lists the curriculum guidelines whose courses fulfill this requirement, the information in the calendars told a different story. Only two calendars gave any indication which courses qualify as a Senior Social Science course. One of the calendars indicated that the Marketing courses (BMK 3/4) met this requirement; yet according to OS:IS Appendix C, this is not the case. The Economics courses (CEC, CER) meet this requirement, but it is unclear as to whether the Business Economics courses (BEC, BER) qualify as well. Also, it would appear that more courses other than those outlined in Appendix C should qualify. Again, to fulfill the Ministry's 16 mandatory credits and simultaneously the 8 endorsement credits, and to develop integrated program packages which are feasible to follow for the OSSD, Ministry clarification is required on this point.

Conclusions

Our analyses of Ministry guidelines, course codes, course descriptions, and calendar content provided us with a greater understanding as to the content, the range, the frequency of courses offered and those that might be offered within the school boards and the schools across Ontario. Roadblocks in implementing the development and use of community and school-related packages appear to exist, however, which could be attributed to a general lack of communication and complete understanding between the Ministry and the schools, as well as to the lack of time for the initiation of OS:IS requirements in the schools and, hence, in the school calendars. None of these problems is insurmountable; some require Ministry of Education decisions, others necessitate school board and school decisions. What is of the utmost importance, though, is that students be given complete, up-to-date, accurate, and consistent information in order to make program and, thus, occupational decisions. Furthermore, our analysis indicated an inability to develop school-related packages at the "grass roots" level, i.e., by the school personnel. The guidelines and the sample packages which this research project will provide should prove beneficial to the schools.

V. ANALYSIS OF COLLEGE PROGRAMS ENTRY SKILLS' REQUIREMENTS

Overview

This section of the report communicates the research team's findings on the Business, Health, and Technology programs within the Ontario Colleges of Applied Arts and Technology (CAATs). In order to develop viable secondary school-to-college course sequences, it was deemed necessary to:

a) examine college program admission requirements;
b) identify entry and exit level competencies for selected programs;
c) determine to what extent students lack entry skill requirements prior to college entry; and
d) obtain the reaction of college officials to the principles and preliminary sequences which led to the initial rendition of the school-related packages.

Although our ultimate objective was to develop secondary school packages which would adequately prepare the students for direct job entry or entry into specific occupational training at the post-secondary college level, we also wished to identify any gaps in the secondary school student's learning as well as overlaps in courses at the secondary school and post-secondary institution. Analysis of college calendars and responses to questionnaires provided the bulk of that information. The final section of this phase of our research is a list of the specific recommendations offered by the college personnel and the research team to the secondary schools in order to increase the students' level of preparation for post-secondary programs and the world of work.

Methodology

Copies of the current 1984 or 1985 calendars were obtained from twenty-two CAATs. Where more than one campus exists, calendars in addition to that of the main campus were obtained. Admissions' policies were analyzed for all the colleges, and an attempt was made to relate admissions' policies to the over- or under-subscription of students into specific courses. Consequently, all college Registrars were sent a letter to respond to this specific concern. (Refer to Appendix B for a copy of that letter.)

Then, using the Ministry of Colleges and Universities' Horizons 1985-86, all post-secondary college programs offered at more than two colleges were listed. These programs were analyzed by college under the following admissions' criteria:

a) pre-requisite skills/course (required and preferred);
b) interview (individual or group; purpose);
c) testing (for selection or prescription);
d) other selection/program criteria;
e) length of program;
f) employment possibilities.

Based on the above information, the OS:IS requirements, and the old, new, and draft Ministry of Education Curriculum Guidelines, sample school-related packages were developed. They were incorporated into a questionnaire which was administered to the Registrar and Heads of Business, Health Science, and Technology at ten colleges. The ten colleges were Algonquin, Cambrian, Centennial, Fanshawe, Mohawk, Northern, Seneca, Sir Sanford Fleming, St. Clair, and St. Lawrence. The colleges were selected to ensure representation by size and region. Letters were sent to the college Presidents requesting permission for the study to proceed. The questionnaire was field tested at Algonquin and St. Lawrence community colleges and then revised before a research assistant formally interviewed the other eight colleges' personnel. Both the sample letter to the Presidents and the two questionnaires (a shortened version for the Registrar) are included in Appendix B. In all, forty-five college officials were interviewed from late January to March of 1985, subsequent to the start of the colleges' second term. The data from the questionnaire were analyzed both within colleges and within programs to determine the intra-college respondent reliability and the consistency of responses among colleges. A summary of those data was compiled independently by two of our researchers to reduce any bias or subjectivity associated with the analysis of qualitative data.

The Findings

A. College Admissions' Policies

The analysis of the twenty-two college calendars revealed similar findings to that of the 1981 study by the Ministry of Colleges and Universities entitled The Educational Background of Students. The general admissions' policy is "open door", requiring the basic qualification for entrance as being the OSSGD, or equivalent, or mature student status. However, the program specific selection criteria vary considerably among and within colleges, as that 1981 document had noted.

The range of program specific criteria which were found partially or wholly in use across the college system included such criteria as:

1. Academic records (required and, frequently, recommended courses, often with minimum acceptable grades for advanced and general level courses -- e.g., 60% from an Advanced-level course or 70% from a General-level course);

2. Supplementary written information concerning a student's previous experiences and expectations;

3. Results of an audition, interview, questionnaire, report, and/or test;

4. Results of testing in English and/or Mathematics; and

5. Other criteria relevant to the program such as work experience, manual dexterity, medical and dental fitness.

Twelve of the twenty-two college Registrars responded to our request for specific program admission requirements (see Appendix B). Indeed, for those programs having a limited enrollment and over-subscription, one or more of those afore-mentioned criteria was stated as being used before the final selection criterion -- that being the random selection of students. Frequently, though, our analysis revealed discrepancies in the specific program admission criteria as stated in the calendar from that which the Registrars forwarded, the latter being much more precise.

Nursing, Dental/Nursing Assisting, Dental Hygiene, and Early Childhood Education were programs reported most often as being over-subscribed. Other programs mentioned by more than one college as being over-subscribed for the 1984-85 year were: Medical/Legal Secretary, Child Case Worker, Social/Developmental Service Worker, Law and Security Administration (Correctional Case Worker), Ambulance and Emergency Care Worker, Medical Laboratory Technologist, Electronics/Mechanical Engineering Technician, and Aviation Technologist.

A general lack of applicants and a lack of qualified applicants, particularly those lacking the Senior Mathematics and Science credits, were the main reasons attributed to the under-subscribed programs, especially in the Technology area. One college Registrar expressed his belief that a general lack of awareness existed among the high school students that they can qualify for and be successful in these college programs.

Interview Data

Two similar questionnaires were developed for our interviews with the personnel of the ten colleges selected as the sample. Both questionnaires were personally administered by a member of the research team (see Appendix B). A shortened version was administered to the Registrars because many of the questions were department and program specific. The longer version was given to the Heads of the Business, Health Science, and Technology Departments or their delegate. In all, forty-five people were interviewed in sessions averaging one and one-half to two hours in length. A summary of each of the topics discussed is included below.

1. Lack of Preparation of Students at Entry (Question 1):

Having investigated the "open door" college admissions' policy, on the one hand, and the very specific program selection criteria operating on the other hand, the first topic dealt

with any problems associated with the incoming student group. Virtually all respondents indicated that, despite the selection process, many secondary school graduates were found to be poorly prepared for their college programs. This was not as prevalent in the programs with limited enrollment such as Nursing and the three-year technology programs. The situation, however, was widespread across college programs, being noted by Registrars and Department Heads alike. Often the reason was attributed to the students' lack of direction, motivation, and knowledge or interest in the program in which they had been accepted. Frequently the Registrars noted that students "backed into programs", i.e., entered a program of second or third choice because their first choice was full.

Although the respondents indicated that students' lack of preparation was often attitudinally related, they concurred that students were lacking certain skills: studying, time management, problem-solving, communication (reading comprehension, writing, attending, and oral communication), basic mathematics (sometimes leading to problems in the Science or Accounting courses), and laboratory skills. If students had the theoretical knowledge of the subject, they often were observed as not being able to apply that knowledge or to use it in other courses or related activities.

2. Remediation (Questions 2, 3, and 6):

In response to the students' lack of preparation and to avoid student attrition or failure, all ten colleges have developed remediation programs at a college-wide and, although less frequently, at a divisional or program level. Students in every program at every college were taking some sort of remediation, with percentages in some programs as high as 50%. The English Departments were usually cited as being responsible for the communication courses, and the Mathematics and Technology Departments for the mathematics courses. The mathematics remediation courses are often conducted in a modular individualized format. Study skills programs have been implemented to deal with problem-solving, time management, and job search techniques; some colleges provide peer tutorial programs. Remedial courses are offered either as a program (e.g., Pre-Health Sciences) or as specific courses (e.g., Physics, Chemistry, Biology, Mathematics, English, Accounting, and Drafting).

Testing, after the students are in "open" programs (programs without supplemental admission restrictions), helps in identifying those students with minimal content competencies. Those students, however, end up carrying a heavier load as they try to "make up" and "keep up" at the same time. Another approach has been to stream students in these basic skills courses. For example, there may be three mathematics or communications courses offered in the first one or two college terms with longer and more frequent sessions each week for the groups who have demonstrated difficulty in the subject. It is anticipated that by the end of the first term or year, the students will have overcome their specific deficiencies.

The colleges, then, are offering a range of remedial activities. College officials recognize, however, that they could and would do even more if they had more fiscal and human resources. Not surprisingly, the colleges would prefer incoming secondary school graduates to be better prepared for their college programs. They have suggested a number of solutions to the secondary schools to deal with this problem. Their recommendations are included at the end of this section.

Some of the smaller colleges have what has been termed as a "flow-through" approach, offering common courses to the first-year students enrolled in both the two and three-year programs. These students have the opportunity to assess their own abilities, motivation, and program interest before specializing in a specific occupation. Frequently, students will transfer into another program within the same occupational family sometime within the first year, resulting in minimal, if any, need to make-up courses. Not only does this approach appear to be more effective in allowing students to defer career decision-making even later than in the secondary school, but it is a more cost-effective way of delivering common courses or program components.

Interestingly enough, however, the main source of diversity was attributed not to students entering college with a General or Advanced-level secondary background, but to mature students. All ten colleges reported an increase in the number of mature students entering or returning to the colleges. Single parent mothers, individuals preparing for second careers, and people who have lost their jobs are coming or returning to the college for training. As well, it was noted that more students have part-time jobs. Other than providing the remedial or preparatory programs offered to any student having difficulty in a course or program, no other "streaming" is available within college programs. The diversity of backgrounds of the entry-level students was not considered a concern after the first year in college.

3. Advanced Credit (Question 5):

Just as it was important to learn how the colleges are coping with the entry level students' lack of preparation, it is necessary to investigate the opposite situation -- how the colleges are dealing with students who are coming into college over-prepared (that is, those already having knowledge, skills, and abilities that are included within courses of the programs they choose).

Of the twenty-two colleges, eighteen indicated that some form of advanced standing, course exemption, or external credit was available. The rhetoric, rules, and procedures differed extensively among colleges, varying from vague statements to those containing clearcut procedures. Three examples quoted from different calendars illustrate this point.

Example 1:

> If you have credits from another college or a university, you may be eligible to obtain credit in your program of study.

Example 2:

> You may qualify for advanced standing for grade 13 and/or post-secondary courses. Once classes have commenced, please see an Admissions Clerk in the Registrar's Office for possible exemptions.

Example 3:

External Credit

External credit is credit granted by the College in recognition of equivalent attainment of the required objectives of a particular College course by previous academic achievement at another institution and/or through work or related experiences.

Students may initiate a request for external credit by completing and submitting an 'Application for External Credit' form to the course instructor prior to the submission deadline for such requests as announced by the course instructor.

Each course division is responsible for establishing and making known to students its policies and procedures for evaluating requests for external credit. Students are responsible for providing documentation necessary to support a request.

Advanced Standing

Advanced standing is credit granted by the College for one or more program semesters and qualifies an applicant for direct entry to the second or higher semester of a program as appropriate. Advanced standing may be granted in cases where previous academic achievement and/or work or related experience qualifies an applicant to be admitted directly to the second or higher semester of a program without jeopardizing the opportunity to be successful in that semester.

An applicant may initiate a request for advanced standing by completing the appropriate section of an 'Application of Admission to Ontario Colleges of Applied Arts and Technology' form and submitting it to the Office of the Registrar prior to the submissions deadline for applications.

Each program division is responsible for establishing its policies and procedures for evaluating requests for advanced standing. These procedures are to include consultation with service divisions to ensure that the applicant has met all program requirements, including admission standards.

Applicants are responsible for providing documentation necessary to support a request.

All ten of the selected colleges offer both course exemptions and advanced standing. The procedures are, in general, similar to that of example three (above).

The respondents said that the majority of the secondary school graduates entering college with a Grade 12 (ignoring students in the Linkage program), were not given any course exemptions as a general rule, but exceptions were made for secondary school courses in drafting, Advanced-level Chemistry, typing, keyboard, and some accounting courses. If a college knows the secondary school and the contents of that particular course, the procedure is somewhat easier. To date, the college officials indicated that no exemptions had been awarded for secondary school computer science and data or word processing courses because of their "newness" in the secondary schools. But the standardization of such new course codes and descriptions within the forthcoming Ministry Guidelines may ameliorate this situation. Colleges often stated, though, that any student is allowed to request and write a challenge examination to ascertain whether he/she qualifies for a course exemption. Regardless, if they do receive an exemption, the students are encouraged to audit the course. Otherwise, they have a free period on their timetable.

Estimations were obtained regarding the percentages of students who request, qualify, and receive course exemptions. To date, no formal data collection procedures exist in the colleges in this area. Obviously, the colleges do not consider this issue to be a major one. Department Heads did indicate that approximately one-half to three-quarters of those "about 5%" of the incoming students who requested an exemption received it. The college personnel admitted, however, that, for the most part, they neither publicized nor encouraged this procedure for one or more of the following reasons:

a) Although the content of the course taken previously may be similar to the college courses, the emphasis may differ.
b) Exemption from a course may result in difficulty or failure in a subsequent college course.
c) If too many students are exempted from a course in one particular area, course instructors may be reduced, i.e., college instructors may lose their jobs.

The question regarding the maximum number of allowable course exemptions elicited a variety of responses, differing within and among the colleges. The range of answers were:

- "no course"
- "only three courses"
- "whatever quota exists that would allow the student to remain as a FTE (full time equivalent)"
- "the college requires a minimum of a one-year residency"
- 25%, 30%, $33\frac{1}{3}$%, or 50% "of the student's program must be completed at the college"
- "no limit."

Despite the increasing numbers of mature students entering or re-entering the colleges with additional work or life experiences and the different foci of the Basic, General, and Advanced Level courses within OS:IS, advanced credit was not identified as an issue by the college personnel. Nevertheless, this topic requires some in-house clarification prior to its documentation in the college calendars. Indeed, the advanced credit procedures in operation at several of the colleges appear to be the exception rather than the rule.

4. Occupational Family Approach (Question 8):

Because one of the main principles of this research is based upon a "family of occupations" approach to training, we considered it important to learn how consistent this approach was with that of the colleges. All the respondents, except those in the Health Sciences, were in favour of and have developed their college programs with a "family of occupations" approach. Many of the Business and Technology programs share a common first term and often a common first year (within program). Many Deans are recognizing the advantage of the "flow through" approach, where a two-year program (e.g., business, technician) then a one and one-half year supplemental program would lead to a three-year diploma (e.g., Business Administration, Technologist). Not only is this process more resource efficient for the colleges, but it allows students to do several things. First, the approach provides them with the core competencies of the large family of occupations (e.g., Business, Technology, Health). Second, it allows students to continue to explore their career options. While giving the students more time to decide on a specific career, the students can still advance in their skill training. In most college programs, specific courses are chosen as electives in the last year and especially in the last term of training. The college personnel mentioned that with existing high unemployment and new jobs which are burgeoning due to technological advancement, they and some of their advisory committees are encouraging the students to remain as general as they can, for as long as possible.

The exceptions to this approach were several of the Health Science programs. Three of the ten Department Heads said that the Nursing program, in particular, is regulated by its licensing and certification requirements; hence, training for that vocation, they felt, is very specific. The other seven of those Department Heads have recognized the commonality of all Health Science programs and have moved or are moving in the direction of a common core curriculum. They recognized that training for a career in Nursing could be re-channelled to the Nursing Assistant program or the Health Records program, as two examples. And conversely, they cited instances where students transferred, although with less frequency, from a Nursing Assistant or Dental Assistant Program into the Nursing Program.

The majority of the college personnel were positive about the research team's "family of occupations" approach and, furthermore, cautioned any student against training for a specific job which may be unavailable or perhaps extinct by the time the secondary school-to-college-to-work route is completed.

5. Program Competencies (Questions 7 and 11):

Another of our objectives in carrying out research on the college programs was to attempt to determine the competencies associated with each program. Questions were asked to try to gain a greater understanding of the programs:

1. What specific competencies do you believe the students should have in order to

   a) enter into the program?
   b) exit successfully from the program?

2. **What type of feedback do you receive on graduates and/or programs from the employers?**

The responses were not as program specific as we had hoped, but were based on competencies believed to be required for each of the general areas, Business, Technology, and Health Science. Each are summarized below.

I Business Occupations:

ENTRANCE COMPETENCIES

- communication skills
  - verbal expression
  - comprehension
  - written expression
  - asking questions directly
  - logical writing
- numerical skills
  - analytical skills
- think abstractly
- apply theory to practice
- interrelate information from one machine to another
- problem-solving skills
- mature attitude
- punctuality
- commitment
- good interpersonal skills
- keyboarding skills
- self-discipline
- assertiveness
- curiosity

EXIT COMPETENCIES

- career specific skills
- minimal job orientation required
- analyze & synthesize
- apply theory to practice
- business mathematics skills
- computer literacy
- creative thinking
- maturity
- interpersonal skills
- enhanced communication skills

The Deans of Business stated that the follow-up surveys regarding their programs and graduates have been quite favourable, for the most part. However, the employees have consistently noted that graduates should have better written and oral communication skills.

II Technology Occupations

ENTRANCE COMPETENCIES

- communication skills
- mathematics competence
- study skills
- time management
- think abstractly
- problem-solving skills (logical, sequential)
- motivation
- willingness to work
- spatial reasoning (conceptualization in three dimensions)
- integrative thinking
- ability to draw
- manual dexterity
- apply theory to practice
- physics
- technical awareness
- laboratory skills
- sort relevant information from irrelevant
- physical ruggedness

EXIT COMPETENCIES

- program specific skills
- communication skills (report writing, resume writing, oral expression)
- problem-solving skills
- independence
- ability to locate information
- ability to adapt to new situations
- flexibility
- computer literacy
- job search skills

As before, the main complaint about the graduates of these Technology programs was that they were lacking in communication skills, especially verbal expression. Other general complaints given are that graduates lack motivation and independence. As one respondent succinctly summarized, "Our graduates are prepared for jobs, but not for the world of work."

III Health Science Occupations

ENTRANCE COMPETENCIES	EXIT COMPETENCIES
-communication skills (write clearly and concisely, speak clearly)	- program specific skills
-numeracy skills (calculating dosages, estimating)	- good physical, mental health
-decision-making skills (organize thoughts, rank tasks, knowing what to do when)	- problem-solving skills
-conceptual reasoning skills	- life skills
- caring and compassion	- judgmental skills
- leadership skills	- citizenship skills
- time/self management skills	- psychomotor skills
- positive self-concept	- affective skills (valuing, attending, caring)
- self-evaluation skills	- self confidence
- manual dexterity (hand-eye co-ordination)	- application of own strengths and weaknesses
- interpersonal skills	- understanding of group interaction
- able to stand the sight of blood.	- normal body functioning strengths
	- ramifications of injury on human functioning
	- computer literacy

Only a few Department Heads said that they had received any criticism of graduates from these programs. Poor communication skills was mentioned again, as was a concern that the graduates were unable to apply some of their theory to practical situations.

6. Response to the School-Related Packages (Question 9):

Each Dean of Business, Technology, and Health Sciences of the ten colleges was asked to scrutinize the preliminary school-related packages relevant to their areas. They were all requested to respond to the packages, making recommendations for course insertions, deletions, sequencing, and the like. In general, most responses were insightful, favourable, and provided the research team with some suggestions for change. The OS:IS mandate of five required English courses was well received by all college personnel, as a way of alleviating the inadequate communication skills of the entry-level students. The Co-op program offered in the secondary schools for those interested in Business or Technology careers was lauded as a viable route.

The suggestions from these college interviews were all taken into consideration for the revised version of the school-related packages. Those packages have been included within Appendix C.

With respect to the Business programs, the Deans stated that keyboarding and an introduction to computers are essential for all secondary school students. As well, a course in organizational behaviour or human behaviour should be considered for inclusion in the secondary school curriculum.

The Deans of Technology pointed out that they have already recommended to the Committee of College Presidents, a series of courses which the Deans have unanimously agreed upon as minimal entrance requirements for the Technology programs: - an OSSD to include two Mathematics for Technology (MTE 3/4), Applied Physics (SPA), Applied Chemistry (SCA), and a new science course which is now being developed called Technological Science (STE). Because that course curriculum is not yet available, resulting in no course offering until 1986 or 1987 (designed to be taken in the fourth year of secondary school), it is impossible to gauge how well it would be received by the secondary schools. The analysis of secondary school 1985-86 calendars revealed that only 2 of 185 schools (less than 1%) have included the Technological Science as a (future) course offering. Other than these five courses, in addition to those listed in OS:IS, they suggested that any further career specific courses are not likely to be available at sufficient secondary schools to make the packages worthwhile for widespread usage. They want to make sure that students are encouraged, not discouraged, from entering the technology programs. Their concern is that more career specific courses and less frequently available secondary school career specific courses may have a negative steering effect upon potential candidates. For example, drafting courses such as architectural and mechanical drafting may not attract a sufficient number of students at the secondary schools to be offered and therefore the colleges cannot realistically make this course an entry-level requirement. They recommended that all courses of this nature be moved into the group of courses entitled "Suggested Support Courses."

Several worthwhile suggestions were also made with respect to the Health Care occupations' preparation. The Deans stated that Human Biology (SBA) was more important to their Nursing and Assisting occupations than the Biology (SBI) course. They thought that the former should be recommended, and the latter supplemental, but only if more secondary schools offered Human Biology. Also, they pointed out that a course in Family Studies should be considered as a recommended course for the Nursing and Assisting occupations, as well as a course dealing with group dynamics or interpersonal skills. The recommended First Aid and CPR (extracurricular) courses were valued as being beneficial for occupational awareness but might lead to overlap with the college programs.

Indeed, over 50% of the respondents mentioned that many of the courses in the packages might result in an apparent or actual overlap with college programs. One Dean of Technology thought that the packages could theoretically result in students being exempted from their entire first year at the college. Most indicated that their college policies on course exemptions may avoid the necessity for a student to take a course twice if duplication did exist. But, it was also noted that although courses may have similar names and some similar content in both secondary schools and colleges, the emphasis in the courses may be different enough to warrant a student to "repeat" the course. Several college personnel did concede that if courses were similar and proved comparable, as a result of testing, then their college courses would have to be adjusted accordingly. And, with the trend toward more mature

students entering college programs, the colleges would not want to make entry more difficult for them. As a group, however, the Deans continued to stress that the secondary schools should concentrate on the basic skills, such as communications, mathematics, and more general problem-solving skill development, rather than specific career preparation.

The overall impression of the school-related packages was favourable. "Proceed, but with caution." If the packages will help the students better prepare for work and college life, yes; but if the packages do not increase the students' level of preparation, restrict the flow of students into the college programs, or alienate those students taking what they consider to be redundant courses, then the packages must be reconceptualized. They stressed, too, that not just the secondary students but the secondary school counsellors and teachers must also be informed as to the content of these packages. Furthermore, liaison with the colleges throughout this implementation phase was considered imperative.

7. Recommendations to the Secondary Schools (Question 4):

Because of the importance of the content, the recommendations of the college personnel to the secondary schools have been placed at the end of this section of the report. The community colleges were pleased to be given the opportunity to assess the school-related packages and recognized the importance of closer links between the two systems -- their post-secondary system and the secondary school system. They have made several suggestions to the secondary schools regarding how that system can better prepare students for college and, consequently, reduce the colleges' need for remediation programs.

Several of their recommendations are by no means new. Neither are they easy to implement, even if some form of "provincial standards" was in place. Such recommendations include:

a) Standardize secondary school exiting requirements.

b) Eliminate grading disparities among courses and among schools.

c) Promote mastery learning, particularly in the English, Mathematics, and Science courses.

d) Reinforce the core competencies across the secondary school curriculum. For example, apply estimation and verification to more than just math problems; display results graphically in courses other than mathematics; include realistic problem solving from other curriculum areas in the math courses; encourage language across the curriculum; provide more practical or "hands on" opportunities for students in order to apply and integrate their course-specific and scientific knowledge.

Other recommendations were offered. These were intended to increase the students' occupational awareness, particularly in the technologies. Examples of these recommendations are:

a) Encourage students to explore different occupational paths through:

- career counselling
- visits to industry
- visits of industry into schools
- visits to colleges.

b) Introduce students, particularly female students, to the wide range of technology occupations, careers, and programs.

c) Provide students at the Grades 9 and 10 levels with "hands on" opportunities to explore the world of technology, and particularly computer technology.

d) Discourage career paths where no recent placements have been documented or early decision-making on a specific occupation.

e) Encourage a student's maximal career choice by continuing to take mathematics and science throughout secondary school.

f) Encourage exploration of a family of occupations, using the Co-operative Education route.

g) Prepare students not only for the world of work and the university, but for life in the college.

h) Encourage individual responsibility in students, their study skills, and time/self management skills.

i) Advise parents and students early in the secondary school program of the post-secondary college entrance requirements.

In addition, a third set of recommendations was proposed, directed towards the secondary school teachers themselves. That set includes:

a) Increase the interaction between the colleges' and the secondary schools' counsellors and instructors of Mathematics, English, Science, Business, and Technology.

b) Provide Business and, particularly, Technology teachers with opportunities to update themselves regarding changes in their field.

Conclusions

The data obtained from the college personnel through our interviews and questionnaires helped to provide a focus for the identification of problems and some solutions to the problems of both the over- and the under-preparation of secondary school graduates entering into college or work. In addition, the principles dealing with the context of the school-related packages were able to be more clearly stated as a result of this information. And finally, both the objectives and the specific content of the school-related packages were analyzed by the college personnel. They approved the objectives and offered some incisive comments and criticisms of the packages themselves. Not only did we think that this aspect of our project was worthwhile, but we think that this activity helped to strengthen the link between the secondary schools and the colleges, in our common goal of providing a smoother transition for students as they progress from school to college and/or to work.

VI. THE WAY AHEAD

Introduction

This final section of the report concludes with an overview of what we set out to accomplish through the research as well as summarizing our findings for the successful implementation of school-related packages.

Specifically, the study was undertaken to investigate the feasibility of developing school-related packages that would complement the objectives of OS:IS. School-related packages were defined within OS:IS as "a particular set of courses planned by the school to provide a curricular emphasis for students ... in support of a particular goal." We determined that such packages were both feasible and necessary for more adequately preparing the secondary school students for post-secondary college education and the world of work. Moreover, several packages were developed as examples, directing students to families of occupations in the Business, Health Sciences, and Technological areas. The development and implementation of such packages were found to have ramifications for the Ministry of Education, the school boards, the schools, the Ministry of Colleges and Universities, and the community colleges. We conclude the report with several suggestions to those different groups in order to close the gaps, to take into account overlaps, and to reduce the inconsistencies that were found within the systems in order to better meet the objectives of OS:IS.

Overview

The research team was asked to explore the possibility of using generic skills as a suitable framework for developing school-related packages. We found this focus to be excellent in theory but too restrictive in practice. Its main downfall was that the generic skills approach would require a restructuring of the way in which core competencies were taught and learned in the secondary school -- a movement away from courses, and incorporating learning modules spanning every course and curricular area. A more pragmatic approach was found, however, which would allow the existing structure of courses to prevail. That approach was to arrange courses across subject areas in a concurrent and sequential fashion directing students not to one specific career goal, but towards a family of occupations. Its forward thrust would encourage students to stay in school but with some, albeit general, vocational end in sight. Thus, students would not feel constrained to make a specific career decision until late in secondary school or until their first year in college. If one career choice

proves too difficult for a student to strive towards, then alternate career paths still remain open with minimal back-tracking.

Ten principles which clarified the conceptual development underlying these school-related packages were formulated. They were specified in Part III of this report. They attempted to encapsulate both the plan and the ease of implementation of the packages within the existing school organization. The packages, then, offer a compromise to the three dilemmas which face educators.

1. General Education versus Job or Post-Secondary Education Preparation;
2. Provisions of "Paper" Credentials versus Skills that will actually be used on the job; and
3. Sequencing of Courses versus Flexibility.

Students can explore certain career paths at an early stage in secondary school and then take different mixes of general and vocational education courses, depending on their abilities, interests, and their stage of career decision-making. The Communications, Mathematics, and Science courses are considered components of most school-related packages to ensure that flexibility and maximum career choices are available to the students throughout and after secondary school. Students can take eight occupational-related Business or Technology courses to obtain endorsements on their transcripts. And furthermore, these packages are accessible to both the secondary school student and the secondary school dropout; acting as guides or road signs for their smooth entry into college and into the workplace.

Suggestions for Ease of Implementation of the Packages

The research revealed some issues which were viewed as roadblocks for the successful and speedy implementation of the school-related packages, and hence of the OS:IS objectives themselves. Our suggested solutions to these concerns follow and are offered to the officials directly responsible for them -- the Ministry of Education, the school boards, the schools, the Ministry of Colleges and Universities, and the colleges.

First of all, we wish to reiterate one of the OS:IS fundamental principles: Basic, General, and Advanced level courses have been and will continually be developed and revised from 1984 to 1986, and undoubtedly every year thereafter, to meet the diverse needs of our secondary school population and allow them to leave secondary school with a certificate, endorsement, and/or an OSSD. Regardless of their level of ability, the students should have acquired the basic knowledge, skills, abilities, and attitudes to become productive members of the Canadian economy and have a measure of self-esteem. OS:IS has been called "A Chance for Change." We suggest, then, that this prime opportunity be used to emphasize that all work in Canadian society is valued.

a) **Clarification of OS:IS Requirements:**

Section 4.6 of OS:IS stipulates that "open-level courses shall no longer be offered." Our research confirmed that all courses are now being labelled as Basic, General, or Advanced courses. But, generally speaking, when a course was available at only one level, we found that course to be labelled as a General-level course. We recognize that it is not feasible to offer all courses at more than one level of difficulty. We suggest, nonetheless, that the Ministry of Education and school officials consolidate to provide firmer direction in this area in order to ensure that students who take mainly General-level courses will not be affected, adversely, as before, when enrolled in open-level courses.

Given the increased number of mandatory courses to be taken for the OSSD, the acquisition of eight strictly Business or Technology Studies courses to qualify for an endorsement appears to be unnecessarily restrictive. Moreover, the research revealed that references to endorsements were vague, ambiguous, or even contrary to the OS:IS recommendations. In addition, procedures are not being consistently applied within school boards nor within Ministry guidelines to identify similar courses across subject areas. If, for example, Math for Business is both a Business credit (BTB) and a Math credit (MTB), then why is Math for Technology (MTC) only allowed as a Math credit and not recorded as a Technology credit? Could the Applied Physics course (SPA) and/or the Applied Chemistry course (SCA) be used toward the Technological Studies' Endorsement? And can an Intermediate division Business or Technological Studies' course be used as one of the 16 mandatory credits and one of the 8 Endorsement credits?

We suggest that the Ministry of Education re-examine the requirements for the endorsements in order to ensure procedural clarification. Two alternatives which might be considered are:

(i) Reduce the number of Business or Technology Studies credits from eight to six for endorsement on the student's transcript, OR

(ii) Allow two of the eight courses required to qualify towards an endorsement on a student's transcript to be either applied math and science or applied math and communications.

By choosing this latter alternative, the Ministry will be encouraging students to continue studying mathematics and science beyond the required two-credit minimum (which could be completed by Grade 10), thus providing a positive incentive to students and, ultimately, allowing them a wider occupational or career choice.

In our review of school calendars, we found that there was some discrepancy as to which courses fulfilled the mandatory credit in the senior Social Science area. Although the OS:IS document (Appendix B, page 39) lists the curriculum guidelines which may be used to fulfill this course requirement, many schools list other courses. This problem of communication should be remedied.

The Business English course (EBS/BBS) would appear to be appropriate to meet the OS:IS requirement of a fifth English course. If this course meets with Ministry approval, then we would suggest that the policy statement in OS:IS be altered to take this into account.

Moreover, since we observed some inconsistency regarding the double-coding of courses which are similar but fall within two curriculum areas, we would suggest that policy and procedures for the double-coding of courses be developed by the Ministry.

b) Board-wide and School Course Calendars:

As was reported in the OS:IS document (Section 5.15, p. 29),

> Some school boards may wish to establish secondary schools organized around specific activities such as the performing arts, special vocations, languages, pure and applied sciences, and technological studies or business studies. As well, as enrolments decline, boards may find the need to offer particular programs only at certain schools....

Our review of the calendars indicated that several school boards have already chosen the above routes. As well, some jurisdictions have compiled school board calendars either in addition to or to complement their schools' calendars. We laud this move and go even further to suggest that schools should continue to have their own calendars but that all school boards should compile and distribute a board-wide calendar listing school board policy (as specified in section 4.15 of the OS:IS document) and the distinctive offerings of each of their secondary schools. Moreover, this board calendar should include the school-related packages offered within the schools. We believe that the implementation of this suggestion will encourage the sharing of resources of schools within the same school board and will also assist the parents and the students in making a more informed decision about the students' own program selection.

School calendars are becoming more standardized each year. In some instances, however, we found the information in them awkwardly presented and much too complex in language level for many parents or students. We offer the following suggestions to improve the utilization of this public relations document and to ensure that it addresses its audience adequately:

(i) The school board and school calendars should be developed in consultation with teachers, parents, and students, to ensure that both content and format make them an appropriate and useful document for their audience of students and parents.

(ii) The calendars, in addition to the requirements listed in section 4.15 of the OS:IS document, should include:

- a Table of Contents;
- school-related packages that are inter- and intra-subject combinations and sequences;

- how the school is organized (e.g., period length, semestering);
- a calendar indicating dates of the Christmas and March breaks, professional development days, examination dates, and school opening and closure dates;
- a consistent use of course codes which match the course description;
- only those courses which have been developed according to the requirements of the Ministry of Education.

c) Vocational Exploration:

Schools do have a difficult task of implementing OS:IS and still ensuring that students have maximum flexibility for career exploration and course selection. Semestering provides greater flexibility in course scheduling and the use of one-quarter and one-half credits that we see in some Technology Departments would help the career exploration requirement. We suggest that the Ministry examine these procedures to deal with the concerns raised. Other curricular areas could use this half- or quarter-credit format (e.g., introductory computer studies, business, and courses in the Arts). This would allow students to be introduced to a wide variety of career fields early in their secondary school experience.

d) Course Content:

As an outcome of our interviews with the college personnel, we have identified several issues which, we believe, should be addressed at the secondary school level for better work and college entry preparation.

With respect to course content, we reiterate some of the suggestions made by the college officials:

(i) More emphasis should be placed on problem-solving, estimating, and interpersonal skills in secondary school courses.

(ii) Occupational career counselling should begin in the Intermediate Division and consistently should be carried throughout the secondary school program.

(iii) Occupational career exploration should occur through "hands on" experience in industry, in the colleges, and in the school laboratories, as well as in the classrooms.

(iv) Career counselling should follow the "family of occupations" approach, rather than encouraging preparation for a specific occupation.

(v) The senior level Human Biology course (SBH) should be offered in more of the secondary schools.

(vi) The (new) Technological Science course (STE) should be made available to students in most secondary schools.

e) College Policies:

The remaining suggestions are directed towards the Ministry of Colleges and Universities and the Ontario CAATs themselves. Our analysis of the twenty-two college calendars and of policy statements, and discussions with Ministry personnel, college officials, and standing committees have led to the following suggestions:

(i) The Ontario community colleges de jure and de facto should have common college and program entrance requirements.

(ii) The CAATs, similar to the secondary schools, should develop and distribute college calendars which reflect the secondary school graduation requirements under both HS 1 and under OS:IS as soon as possible.

(iii) The Ministry of Colleges and Universities and the CAATs should consider establishing some common policy and procedures regarding advanced standing and course exemptions of those Ministry-approved courses and programs for which students are routinely requesting exemptions.

(iv) The college calendars should advertise that all students have the right to be given credit for a college course provided they demonstrate satisfactorily to the Department Head their mastery of that course.

(v) Colleges should examine the number of students and the types of courses in which students receive advanced standing. This information should be shared with the neighbouring secondary school boards and schools, so that both the secondary schools and the colleges can take it into account in their counselling and program/course planning.

The research pointed out, however, that while some secondary school graduates may have taken similar courses in secondary school, more often graduates are found to lack certain competencies or courses upon college entry. The predominant present practice of the colleges is to offer remediation to these students concurrently with their normal program. The "poorer" student, then, is forced into a "make-up" and "keep up" situation. We would suggest that the colleges should investigate different ways of providing remedial assistance to such students, to ensure that they can graduate successfully from college.

As may be recalled, we also noted statements to the following effect: "The minimum entrance requirements are 60% on (certain) Advanced level courses or 70% on General level courses." But courses developed under the OS:IS guidelines are different. Such differences should be honoured throughout the Ontario education system. Although we recognize the difficulty of instituting such a policy, we would suggest that specific program entrance policies exclude the equating of grades between General and Advanced-level courses. A first step in this process would be for college personnel to become more familiar with the appropriate Ministry of Education curriculum guidelines regarding the content of these distinctive courses.

The college officials pointed out another area of overlap between the secondary schools and the colleges. Students could graduate from secondary school after four and one-half years. With the introduction of OS:IS and the expanded use of semestering in secondary schools, there will be a substantial increase in the number of students eligible for college

entry in January of each year. If they wish to go on to college, normally those students must "cool their heels" for seven months and then compete for college entrance with the students who graduate at the end of June. Currently, the colleges' early January entry date does not correspond with the end of the first semester in most secondary schools. We would suggest that a feasibility study be undertaken to consider the alteration of either or both college and secondary school semester dates to respond to this concern.

We should comment on the receptivity by the community college personnel of this research project and of the OS:IS document. Their concern for the student's successful exit from secondary school and smooth entrance into community college is paramount. Hence, they were thoughtful, helpful, and positive through this whole data collection process, and even surprised us with their level of awareness about OS:IS.

We, as a precautionary note, would like to offer a final suggestion coming from that group. The Ministry of Education should involve representation from the colleges in discussions of course and program changes at the secondary school level that may directly affect the colleges.

Summary

In this research project we have attempted to conceptualize and develop school-related packages that will facilitate a smooth and successful transition for those students moving through secondary school and into the community college and/or the workplace. The data collection and analysis involved both the secondary schools and the colleges. Both sources have provided the information and framework we used to prepare the school-related packages for families of occupations in the Business, Health Sciences, and Technological areas that appear in Appendix C.

As well, we have taken the liberty of making a number of suggestions to ensure the success of OS:IS, the usefulness of the school-related packages, and, most importantly, the success of the college or work-bound student.

OS:IS has been called "A Chance for Change," offering us all an opportunity to deal with the remainder of the "turbulent 80s" in a proactive manner. We are fully aware that as the issues and, accordingly, the courses and the programs change, the school-related packages must also be adapted. While this report has encapsulated a specific period of time for the Ontario school system, we would prefer that it be considered not as an end but more as a beginning for the way ahead.

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APPENDIX A

LETTER SENT TO SECONDARY SCHOOLS

SOCIAL PROGRAM EVALUATION GROUP

Duncan McArthur Hall
Queen's University
Kingston, Canada
K7L 3N6
Tel. 613 547-6149

February 20, 1985

Principal

Dear

As part of a team at Queen's University, I am in the beginning stages of some research which is designed to provide information that could be used for curriculum development activities to complement the career thrust of Ontario secondary schools, as outlined in Sections 5.9, 5.10, 5.11 of the OS:IS. We are looking into the possibility of developing secondary school course groupings and sequences that will prepare secondary school-leavers for entry into college programs and/or broad or specific occupational areas.

In order to begin to explore this area, I am requesting a copy of your calendar indicating courses available and any information you have prepared on the sequencing of courses.

Should there be any cost incurred in sending me this information, just bill me and I will reimburse your school.

Thanking you in advance for your assistance in this matter, I remain

Yours truly,

Ruth Rees, PhD,
Assistant Professor,
Faculty of Education.

APPENDIX B

LETTERS AND QUESTIONNAIRES SENT TO

OFFICIALS OF CAATs

SOCIAL PROGRAM EVALUATION GROUP

Duncan McArthur Hall
Queen's University
Kingston, Canada
K7L 3N6
Tel. 613 547-6149

November 22, 1984

President
College of Applied Arts & Technology

Dear

I am formally requesting your community college's assistance and inclusion in a research project which is designed to improve the preparation of students prior to entry into college programs. We are attempting to identify those combinations of courses which are the most appropriate for particular groups. The study is jointly sponsored by the Ministries of Education and Colleges and Universities and the Ontario Secondary School Teachers' Federation.

We will be focussing on the Technology, Business, and Health areas and will require input from your Registrar, Admissions Officer, Division Heads, and Program Heads in order to determine:

1. The variation in the secondary school preparation of students in these programs.

2. The range of courses that have been initiated to facilitate successful student achievement in these programs.

3. The positive and negative aspects of certain secondary school course combinations and sequences.

4. The possible implications within the college of promoting these curriculum packages in the secondary schools.

Subsequent to our initial field testing, we request permission to have the research officers make arrangements to visit your college in early January in order to question the necessary personnel. With your approval, we will make contact with these individuals directly.

In order to carry out the necessary planning, I would appreciate if I could receive formal notification from you by December 7, 1984. Be assured that the information obtained will be used in an aggregate form and will be kept confidential.

Yours truly,

Ruth Rees, PhD,
Assistant Professor,
Faculty of Education.

SOCIAL PROGRAM EVALUATION GROUP

Duncan McArthur Hall
Queen's University
Kingston, Canada
K7L 3N6
Tel. 613 547-6149

February 1, 1985

Registrar
College of Applied Arts & Technology

Dear

As you may recall, I wrote you earlier this term requesting your college calendar. As part of the continuing research involving the secondary school curriculum packages as preparation for college programs, I would appreciate receiving information on the Technology, Business and Health programs in your community college.

Specifically which programs have been identified as being:
a) over-subscribed
b) under-subscribed?

For these programs which are over-subscribed, how are the students selected? If the selection process varies by Division and within Division, I would appreciate receiving the differing criteria.

Has any pattern been attributed to any of the under-subscribed courses -- such as a lack of applicants or a lack of qualified applicants?

I am attempting to obtain this data from all the Ontario Colleges of Applied Arts and Technology in order to identify any provincial-wide similarities and disparities. Be assured that this information will be used only in an aggregate form.

Yours truly,

Ruth Rees, PhD,
Assistant Professor,
Faculty of Education.

INTERVIEW GUIDELINES

FOR

ACADEMIC COLLEGE PERSONNEL

College: Date:

Division: Programs:

Interviewee:

Position:

1. a) Despite the selection process, do many students arrive from the Ontario secondary schools ill-prepared for their college programs? YES or NO

   b) If so is there a particular program(s), in your department, that has reported this problem? YES or NO If YES, which one(s)?

   c) Is there any specific subject matter in which students are deficient? YES or NO. Please provide an explanation.

2. a) Is it necessary for the college to provide remedial courses to assist the students? YES or NO (If NO, Go to #5)

   b) If so, in what specific areas with respect to programs by course, specifying content.

   (i) program (ii) course (iii) content

3. a) Are there now such remedial courses being offered? YES or NO
   b) If so, what are:

   (i) program (ii) courses (iii) approx. enrollment (iv) content?

4. What could the secondary schools do to eliminate the need for students' remediation in the college?

5. a) What is the procedure with respect to a student acquiring
      (i) course exemption
      (ii) advanced standing in a program (Note: Identify the programs in which these courses occur.)

b) How much advanced standing or exemption is allowed within a program (i.e., is there a maximum number of courses)?

c) What percentage of the students receive, request, and/or qualify for advanced standing or exemptions (by program)?

Program	Receive	Request	Qualify

d) Do advanced standing or exemptions affect program continuity? YES or NO. If YES, how?

6. I'd like to next ask a question regarding the diverse backgrounds of students in the programs (e.g., mature student, one who has completed secondary school, one with a university background).

(a) How do you deal with this issue?
(b) Have you observed any trends (i.e., a preponderance of students with one type of background)?

7. We've spoken about courses, now let's deal with competencies (e.g., typing 50 wpm., ability to read blueprints, priorizing of treatment). What specific competencies do you believe the students should have in order to:

a) enter into the program?
b) exit successfully from the programs?

	COMPETENCIES	
PROGRAM	ENTRANCE	EXIT

8. There appears to be two approaches with respect to training. One approach is to train for a specific job. The second approach, initially using a core curriculum, is to train for a family of occupations. Please comment on the merit and the application of each of these approaches for your programs.

The new secondary school curriculum has changed the graduation requirements for secondary school from 27 to 30 credits, and from 9 to 16 as the compulsory credits. These sequences incorporate the Ministry requirements. Ultimately, we hope that these packages will provide some guidance to secondary school students for entrance and success in the college programs. But, we need your input. Let's look at some secondary school-based packages one at a time.

9. a) Do these packages make sense?

b) Can you suggest any changes to reflect your needs?

c) Can you see anything in these packages that suggests an overlap with your subject matter? (Note: Prompt to get specific overlaps.)

d) Can you anticipate any problems within the college in the event that secondary schools implement these packages?

10. We're also looking at the entry level jobs in the labour market.

What jobs do the students find when or if they withdraw from the college program?

11. What types of feedback do you receive on graduates and/or programs from the employees?

Thank you very much

INTERVIEW QUESTIONS

FOR

REGISTRAR/ADMISSIONS COLLEGE PERSONNEL

College: Date: Division:

Interviewee:

Position:

1. a) Despite the selection process, do many students arrive from the Ontario secondary schools ill-prepared for their college programs? YES or NO

   b) If so, is there a particular program(s) that has reported this problem? YES or NO
   If YES, which one(s)?

   c) Is there any specific subject matter in which students are deficient? YES or NO. Please provide an explanation.

2. a) Is it necessary for the college to provide remedial courses to assist the students? YES or NO (If NO, Go to #4)

   b) If so, in what specific areas with respect to programs by course, specifying content.

   (i) program (ii) course (iii) content

3. a) Are there now such remedial courses being offered? YES or NO

   b) If so, what are:

   approx.
   (i) program (ii) courses (iii) enrollment (iv) content?

4. a) What is the procedure with respect to a student acquiring
   (i) course exemption
   (ii) advanced standing in a program

   (Note: Identify the programs in which these courses occur.)

   b) How much advanced standing or exemption is allowed within a program (i.e., is there a maximum number of courses)?

   c) What percentage of the students receive, request, and/or qualify for advanced standing or exemption (by program)?

Programn	Receive	Request	Qualify

6.1

APPENDIX C
SCHOOL-RELATED PACKAGES

SCHOOL-RELATED PACKAGES

Overview

This portion of the report gives some examples of the types of school-related packages (in both content and format) that could be developed by the schools or school boards for use by students who require some career guidance as they progress through secondary school.

These packages were developed following ten fundamental principles which were outlined in Part III of this report. The aim of these school-related packages is to help guidance counsellors, teachers, parents, students, and returning students (often the high school drop-out) decide on a comprehensive secondary school program for occupational exploration and/or vocational selection.

Whereas other packages are more subject-related, these packages are school-related in focus. Different combinations of both academic and vocational courses taken concurrently and in a particular sequence make up the packages. They are designed to provide students with a greater understanding of career alternatives and to effectively prepare them for the next stage of their education.

Rather than restricting students, these packages are to be viewed as a flexible framework for guidance. In other words, students should be encouraged to consider some alternatives: one, they can select all the courses offered in a package; two, students can substitute courses that offer similar content (particularly as new courses are introduced into the school); three, students can choose courses selectively from within a package (especially those courses listed under "Suggested Support Courses"); or four, students can take courses which are from different packages until they become more certain about their future goals. Although most of the courses could be offered, theoretically, at all three levels of difficulty, it would be unlikely that all courses at all levels of difficulty are offered at every school.

Furthermore, the understanding is that while some students know exactly where they are going in Grades 9 or 10, others will not. This latter group should be encouraged to investigate different occupations, particularly those in the Technology area. Introductory courses should be accessible to students in both the Intermediate and Senior divisions in order to give them the flexibility and choice in their occupational decisions.

The courses in these packages are divided into two groups -- Recommended Core Courses and Suggested Support Courses. The Recommended Core Courses include the essential academic

courses of English, Mathematics, and Science, and the minimal vocational or occupational courses that will help orientate students to a family of occupations, the world of work, and provide a smooth transition into post-secondary college programs. The Suggested Support Courses are to give the student more readiness for the family of occupations or the specific vocation of his or her choice. If a student is interested in drafting, for example, but would prefer architectural drafting to mechanical drafting, then the Support Courses should include at least one construction course. For those students planning to look for employment directly after they graduate, more of these Suggested Support Courses are recommended. While one student may choose to make up his or her own timetable with more of the traditional academic subjects, another student may wish to take more courses leading to a family of occupations, while another might wish to integrate courses from Business and Technology or Business and the Arts, as two examples.

Examples of School-Related Packages

The remainder of the report is directed to guidance counsellors, employment counsellors, teachers, parents, and especially students. It includes only some examples of school-related packages that the researchers have developed within the fields of Business, Health, and Technology that were targetted for students who take the majority of their courses at the General-level of difficulty. The assumption is if those students go on to acquire further education or vocational preparation, they will do so within a college or vocational institute.

The examples presented in the following pages, then, do not, by any means, include all the families of occupations in each of the Business, Health, and Technology fields. The apprenticeship routes, the families of occupations requiring university preparation, and the specialized career programs available in unique or privately-funded institutions were deliberately excluded from these examples. It was outside the mandate of this study to develop a full range of school-based packages.

These school-related packages, then, have been developed both in theory and in practice, with the intent of helping the schools implement the objectives of OS:IS and, more specifically, to facilitate the students' movement through school to college and/or work in such a way that they become contributing members of the Canadian society. Consequently, the remainder of this report outlines a way of using these school-related packages, and the types of employment and post-secondary college programs that are available as a logical outcome of these choices.

In conclusion, these packages have been developed with flexibility in mind -- not only from the students' perspective, but also from the viewpoint of the educators who will, ultimately, be assessing the usefulness of these packages. Each school board and school is encouraged to adapt these packages to best fit in with their own resources, programs, and ways of delivering courses. For example, for most of the Technology school-related packages, four exploratory courses have been grouped together under the "Recommended Core Courses." These courses could be offered as one course worth one or two credits, often referred to as the

Exploratory Technology course (TIE), or they could be offered as separate courses for one-quarter or one-half credits each.

The school-based packages offered here are based on extensive discussion with college officials, secondary school principals and teachers, and Ontario Government representatives. The packages are designed to be adaptable to the needs of schools, boards, and, particularly, students.

SCHOOL-RELATED PACKAGES

Explanation to Students

You may not know exactly which occupation to seek or which post-secondary program to apply for, but you should have a good picture of which courses lead to which goals. This will enable you to make good sound course selection as your plans for the future become clearer.

The diagrams and charts on the following pages have been drawn up as course selection guides to help you plan for your future.

Requirements for the OSSD

The Ministry of Education requires that each student who entered Grade 9 in September 1984 obtain a minimum of 30 credits in order to graduate.

Sixteen (16) of those credits have been decided already by education officials. The remaining 14 credits can be chosen by the student.

A student may wish an endorsement on his or her transcript to indicate that he or she has a specialized program, for example in Business or Technological Studies. Then the student is required to take eight (8) courses in Business or Technological Studies before he or she graduates.

Here is a chart to show the requirements for the OSSD. Each student must make sure that these courses are taken. The Intermediate Division refers to Grades 9 and 10; the Senior Division to Grades 11 and 12.

Ontario Secondary School Diploma Requirements:

5	English (or français) at least two of which must be from the Senior Division
2	Mathematics
2	Sciences
1	History
1	Geography

1	Senior Division Social Science
1	French (or anglais)
1	Arts
1	Physical & Health Education
1	Business/Technological Studies

Total:	16	REQUIRED COURSES
+	14	ADDITIONAL COURSES

OSSD

BUSINESS OCCUPATIONS

A student may want to work eventually in one of the many Business occupations. Some of the different families of those occupations are:

Secretarial, Office Administration, and Word Processing Occupations;
Clerical and General Business Occupations;
Accounting and Data Processing Occupations;
Marketing Occupations.

There are several ways of attaining positions in any of these families of occupations. The most common way is to finish secondary school and then either go to college or obtain a job in your area of interest. If you go to college, you can choose programs which will lead to a three-year Business Administration or a two-year Business diploma. Most people would agree that by taking courses at the college level you will have a better chance of finding a job in your interest area, and being prepared for advancement in that job.

But if you do leave school early and want to know how to go about continuing your education, the diagram on the following page will show you the different routes which are available. Once you have been out of school for a year, you are considered a "mature" student and can qualify for entrance into a college program. Studies have found, however, that unless you have a high school graduation diploma or its equivalency, you will find the college courses rather difficult.

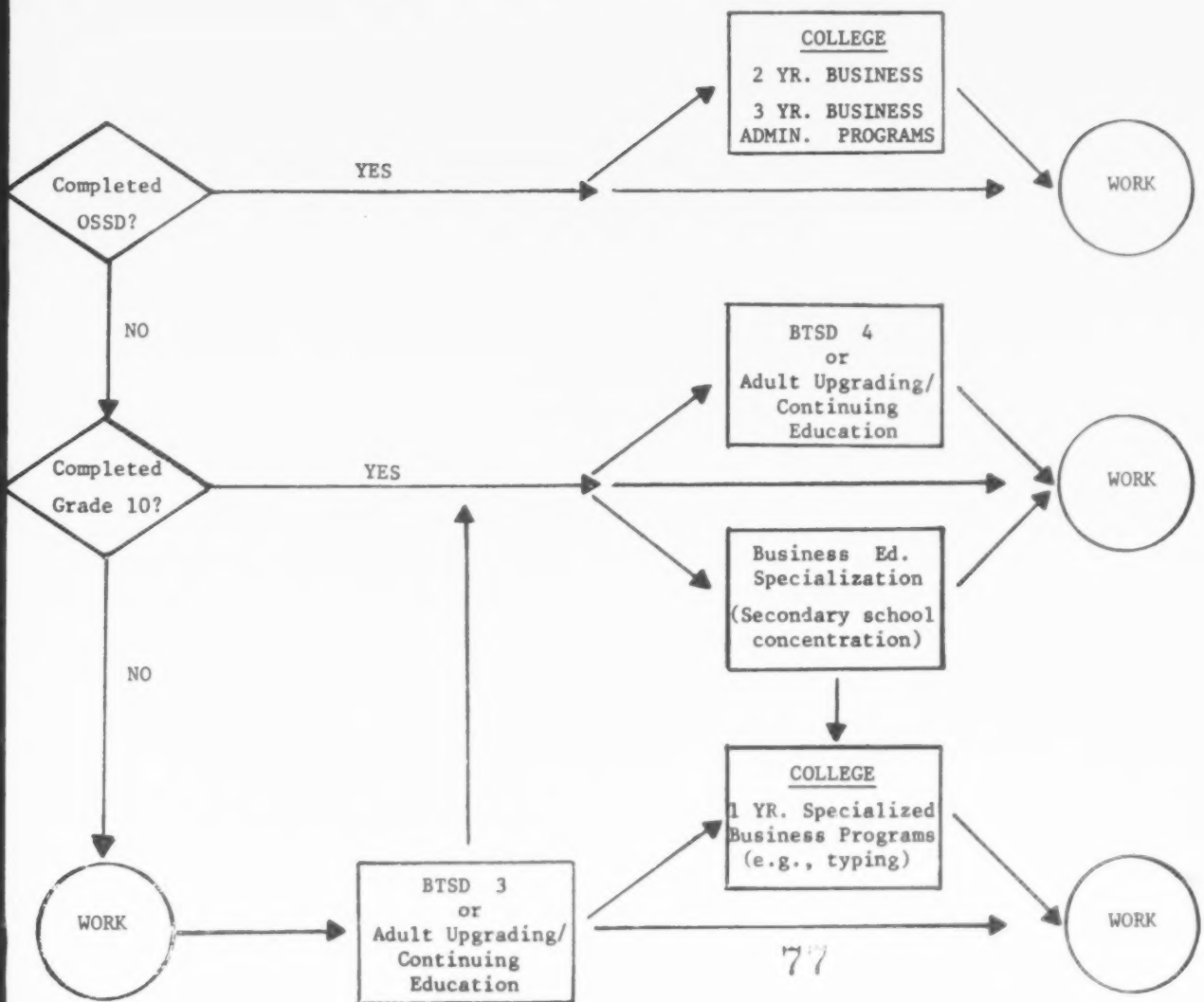
Following that chart are some packages that will act as a guide to help you in secondary school in preparing for either the world of work or college entry in the family of occupations of most interest to you. Certainly for any career in the business world, you must be able to communicate clearly through effective speaking, writing, listening, and reading. Furthermore you must be able to compose business letters and reports, proof-read, and use grammar and punctuation correctly.

Students wanting experience and training in specific business opportunities are strongly encouraged to take the Co-operative Education (Business) program while in their senior years of secondary school.

And those students intending to seek employment immediately after graduation may wish to strengthen their vocational preparation by showing their prospective employer a "Business Endorsement" on their transcript. Remember -- if you want this endorsement, you will need to take eight courses from the Business Studies division prior to graduation. (All those Business course codes start with the letter "B".)

SCHOOL-TO-WORK ROUTES

BUSINESS OCCUPATIONS



Secretarial, Office Administration, & Word-Processing Occupations

If you are interested in a secretarial or word-processing career, not only must you develop good keyboarding skills but you should be capable of using current office equipment such as wordprocessors and machine transcribers. You would also be required to apply current procedures to your day-to-day office routines.

Strong communication skills (reading, writing, listening, speaking) are very important for office occupations. Increasingly, too, a familiarity with the computer and some of its business applications are important advantages in the modern business office.

Good inter-personal skills and a business-like attitude will also be most helpful in this occupational area.

With the growth of the new office technologies, the need for shorthand has declined recently. Frequently, however, shorthand is required, especially in many legal firms, and for the more senior position of executive secretary. Personal-use shorthand skills are still highly useful in the office and can be obtained from an initial shorthand course.

A growing career area is that of the office administrator or administrative assistant -- one who is more concerned with the administrative tasks of running the office and less with keyboarding and word-processing skills. Someone with this interest will find it important to pick up more of the "Suggested Support Courses" to build up a broader sense of business awareness.

SECRETARIAL, OFFICE ADMINISTRATION, AND WORD PROCESSING OCCUPATIONS

RECOMMENDED CORE COURSES

Grades 9 & 10	Grades 11 & 12
● ENGLISH (ENG 1, 2)	● ENGLISH (ENG 3, 4)
	● BUSINESS ENGLISH (BBS/EBS)
● MATHEMATICS (MAT 1, 2)	MATH FOR BUSINESS 1, 2 (BTB/MTB)
● KEYBOARDING (1, 2) (BKI, BKA)	KEYBOARDING 3 (BKW)
INTRO TO BUSINESS (BBI)	INTEGRATED OFFICE SYSTEMS I, II (BSI)

OSSD

TO WORK

SECRETARY
ADMINISTRATIVE ASSISTANT
TYPIST
RECEPTIONIST
STENOGRAPHER
MAIL/MESSAGE PERSON
DATA INPUT CLERK
WORD PROCESSOR
FILE CLERK
STATISTICAL CLERK
GENERAL CLERK
SALES CLERK
CASHIER

SUGGESTED SUPPORT COURSES

INTRO TO COMPUTERS (DIC)	DATA PROCESSING CONCEPTS (BPC)
ACCOUNTING: INTRODUCTION (BAI)	ACCOUNTING: APPLICATIONS (BAA)
	MANAGEMENT STUDIES (BOS)
	● LAW (BLW)
	CONSUMER STUDIES (BCS)
	● ECONOMICS (BEC) RETAILING (BMR) MARKETING (BMK)

TO COLLEGE

(Check with colleges for specific entry requirements)

* 4 sem SECRETARIAL
  4 sem LEGAL ASSISTANT
  2 sem GENERAL SECRETARY
  2 sem WORD PROCESSING
  16 wk WORD PROCESSING OPERATOR
  6 sem OFFICE SYSTEMS ADMIN.
  40 wk AUTOMATED OFFICE SKILLS

* With specialization in Medical, Legal, Executive or Bilingual Executive

Note: sem = Semester

● COURSE(S) MAY COUNT TOWARDS THE 16-CREDIT REQUIREMENTS. CHECK WITH THE GUIDANCE COUNSELLOR FOR SPECIFIC CREDIT(S).

Clerical and General Business Occupations

A student interested in pursuing a career in one of these occupations must have a general understanding of how a business operates, and enjoy working with numbers. He or she must be able to carry out basic arithmetic operations using electronic calculators and computers.

Strong communication skills (reading, writing, listening, speaking) are very important for office occupations, and are a focus of the Business English course. Good inter-personal skills and a business-like attitude also will be most helpful in these occupations.

A wide variety of choice among the "Suggested Support Courses" will help the student to develop a useful and broader sense of business awareness, and a better appreciation for the range of specialized occupations open to the business student.

CLERICAL AND GENERAL BUSINESS OCCUPATIONS

RECOMMENDED CORE COURSES

Grades 9 & 10

- ENGLISH (ENG 1, 2)
- MATHEMATICS (MAT 1, 2)
- INTRO TO BUSINESS (BBI)

KEYBOARDING 1 (BKI)

ACCOUNTING: INTRODUCTION (BAI)

Grades 11 & 12

- ENGLISH (ENG 3, 4)
- BUSINESS ENGLISH (BBS/EBS)
- MATH FOR BUSINESS 1, 2 (BTB/MTB)

ACCOUNTING: APPLICATIONS (BAA)

DATA PROCESSING CONCEPTS (BPC)

OSSD

TO WORK

CASHIER
TYPIST
RECEPTIONIST
STENOGRAPHER
MAIL & MESSAGE PERSON
DATA INPUT
FILE CLERK
STATISTICAL CLERK
SALES CLERK
PAYROLL CLERK
ACCOUNTS, INVOICING CLERK

SUGGESTED SUPPORT COURSES

KEYBOARDING 2: APPLICATIONS (BKA)

- KEYBOARDING 3: APPLICATIONS (BKW)

CONSUMER STUDIES (BCS)

- LAW (BLW)
- ECONOMICS (BEC)

MANAGEMENT STUDIES (BOS)

INTEGRATED OFFICE STUDIES (BSD)

MARKETING/RETAILING (BMK/BMR)

TO COLLEGE

4 sem GENERAL BUSINESS, FINANCE, LEGAL ASSISTANT

40 wk ACCOUNTING ASSISTANT

2 sem TRAVEL CONSULTANT

4 sem HOTEL MANAGEMENT -- FOOD & BEVERAGE

12 wk HOTEL -- FRONT OFFICE & RECEPTION

- COURSE(S) MAY COUNT TOWARDS THE 16-CREDIT REQUIREMENTS. CHECK WITH THE GUIDANCE COUNSELLOR FOR SPECIFIC CREDIT(S).

Note: sem = Semester

Accounting and Data Processing Occupations

Computers have become so tied in with today's accounting applications that those interested in accounting should, by necessity, develop good data processing skills. If a business career in either accounting or computers interests you, it is important to take courses in both of these areas. Also, you should have an interest in working with numbers (transcribing, calculating, estimating) and, in fact, be aware of the necessary Mathematics and other entrance requirements if you decide to follow these occupational choices at the college level.

Strong communication skills (reading, writing, listening, speaking) are very important for office occupations, and are a focus of the Business English course. Good inter-personal skills and a business-like attitude will also be most helpful in these occupations.

A wide variety of choice among the "support" courses will enable you to develop a useful and broader sense of business awareness.

ACCOUNTING AND DATA PROCESSING OCCUPATIONS

RECOMMENDED CORE COURSES

Grades 9 & 10

- ENGLISH (ENG 1, 2)
- MATHEMATICS (MAT 1,2)
- KEYBOARDING 1 (BKI)

INTRO TO COMPUTERS (DIC)

ACCOUNTING (BAI/BAP)

Grades 11 & 12

- ENGLISH (ENG 3, 4)
- BUSINESS ENGLISH (EBS/BBS)

MATH FOR BUSINESS 1,2 (BTB/MTB)

DATA PROCESSING (BPC, BPA)

ACCOUNTING (BAA/BAP)

OSSD

TO WORK

ACCOUNTANT
CASHIER
MAIL/ MESSAGE PERSON
DATA INPUT
FILE CLERK
BOOKKEEPER
MATERIAL RECORDING
OFFICE MACHINE OPERATOR
EDP EQUIPMENT OPERATOR
STATISTICAL CLERK
SALES CLERK
PAYROLL CLERK

TO COLLEGE

6 sem BUSINESS ADMINISTRATION or COMPUTER SYSTEMS

4 sem GENERAL BUSINESS specializing in ACCOUNTING or DATA PROCESSING

4 sem FINANCE

4 sem HOTEL MANAGEMENT -- FOOD & BEVERAGE

40 wk ACCOUNTING ASSISTANT

Note *sem = Semester*

SUGGESTED SUPPORT COURSES

INTRO TO BUSINESS (BBI)

KEYBOARDING 2 (BKA)

MANAGEMENT STUDIES (BUS)

MARKETING (BMK)

- ECONOMICS (BEA/BEC)
- LAW (BLW)

INTEGRATED OFFICE MACHINES I (BSI)

- COURSE(S) MAY COUNT TOWARDS THE 16-CREDIT REQUIREMENTS. CHECK WITH THE GUIDANCE COUNSELLOR FOR SPECIFIC CREDIT(S).

Marketing Occupations

The choice of occupations in Marketing is quite widespread. A future in retail merchandising, for example, exists in relation to virtually all types of goods and services.

The recommended courses provide the fundamental preparation for this occupational orientation.

Strong communication skills (reading, writing, listening, speaking) are very important for business occupations, and are a focus of the Business English course. Good inter-personal skills are most helpful in this choice of occupations. Increasingly too, a familiarity with the computer and some of its marketing applications would be an important advantage to a person interested in these occupations.

A wide variety of choice among the "support" courses will enable you to develop a useful and broader sense of business awareness from the buyer-seller viewpoints. Of particular value, for example, would be a Consumer Studies course, which focuses on the needs and rights of the consumer, who, of course, will eventually be your "customer".

MARKETING OCCUPATIONS

RECOMMENDED CORE COURSES

Grades 9 & 10

- ENGLISH (ENG 1, 2)
- MATHEMATICS (MAT 1, 2)
- INTRO TO BUSINESS (BBI)

KEYBOARDING 1 (BKI)

Grades 11 & 12

- ENGLISH (ENG 3, 4)
- BUSINESS ENGLISH (EBS/BBS)

MATH FOR BUSINESS 1, 2 (BTB/MTB)

or MATH (MAT 3, 4)

MARKETING (BMK 3, 4)

DATA PROCESSING CONCEPTS (BPC)

OSSD

TO WORK

CASHIER

MATERIAL RECORDING, SCHEDULING CLERK

SHIPPING & RECEIVING CLERK

SALES CLERK

SALES (SERVICES) JOBS

SUGGESTED SUPPORT COURSES

INTRO TO COMPUTERS (DIC)

ACCOUNTING (BAI/BAP)

RETAILING (BMR)

MANAGEMENT STUDIES (BOS)

- ECONOMICS (BEA/BEC)

ACCOUNTING (BAA/BAP)

CONSUMER STUDIES (BCS)

- LAW (BLW)

RETAILING (BMR)

TO COLLEGE

4 sem GENERAL BUSINESS specializing in MARKETING

6 sem BUS. ADMINISTRATION, with MATH (MFD), specializing in MARKETING

4 sem RETAIL MERCHANDISING

- COURSE(S) MAY COUNT TOWARDS THE 16-CREDIT REQUIREMENTS. CHECK WITH THE GUIDANCE COUNSELLOR FOR SPECIFIC CREDIT(S).

Note: sem = Semester

HEALTH OCCUPATIONS

A student may want to work in one of the many careers associated with the Health occupations. These occupations are quite varied and range from the provision of direct health care, from working directly with people, to the more indirect or technical area of providing diagnostic support services in a laboratory setting.

A way of grouping some of these Health occupations which are described on the following pages is given below. (Remember that those occupations listed represent only a fraction of the wide assortment of occupations in this field.)

Direct Care Occupations
- Ambulance and Emergency Care
- Nursing
- Nursing Assistant
- Chiropody
- Denture Therapy
- Health Care Aide

Rehabilitation Care Occupations
- Physiotherapy
- Occupational Therapy

Diagnostic Support Occupations
- Radiology
- Medical Laboratory Technology

Other Health Care Service Occupations
- Dental Assistant
- Pharmacy Assistant

Many of these occupations, such as nursing and dental assistant, are very popular ›ices. These occupations need qualified personnel constantly. Employment is available in most places in Canada. And work in virtually all the health occupations is restricted to people who have, for the most part, occupational preparation in some type of post-secondary institution, such as college, Ryerson Polytechnical Institute, Toronto Institute of Medical Technology, or university. As a consequence, the post-secondary programs at the colleges leading to qualifications in these occupations are frequently over-subscribed and have waiting lists. In order to qualify, students are advised to prepare themselves fully through the educational programs offered in the secondary schools. It is also suggested that students take as many mathematics and science courses as they can fit into their timetables at levels appropriate to their ability right through secondary school.

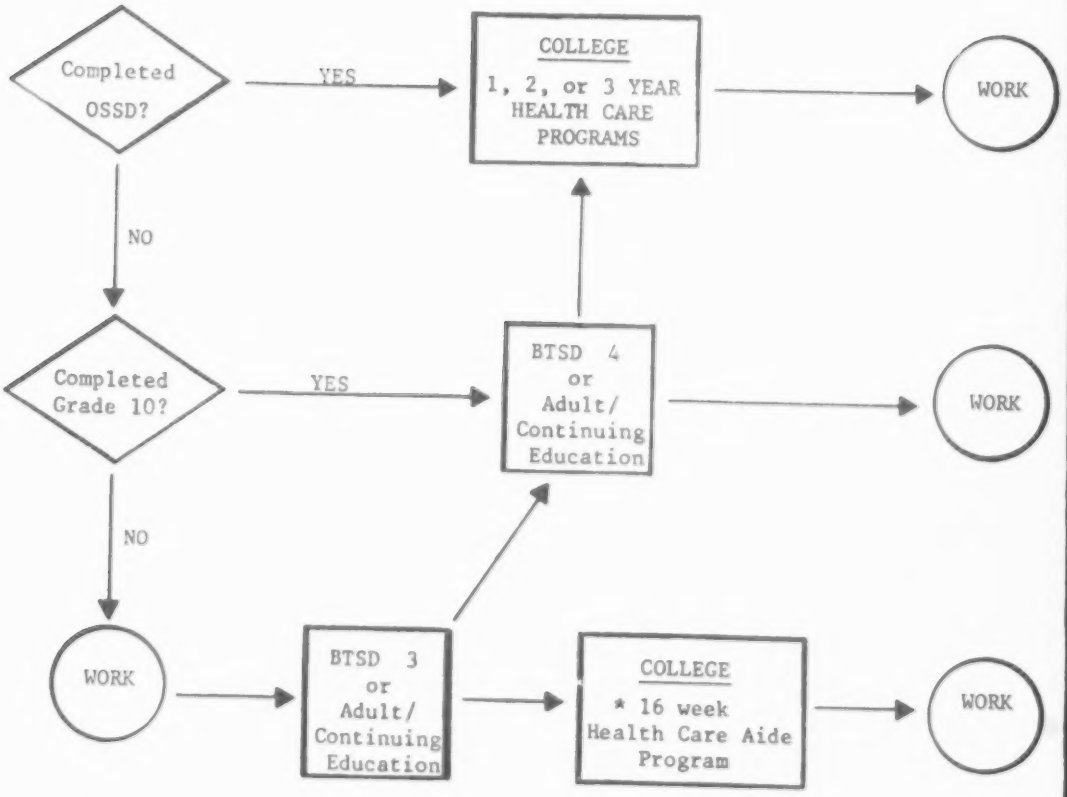
Some students withdraw early from secondary school. Those students having completed Grade 10 (with a secondary school certificate or the adult upgrading equivalency -- BTSD 3) can consider the 16-week Health Care Aide program offered at some of the community colleges either as a day or an evening program. But the remainder of work in the Health occupations

requires post-secondary preparation following a completed OSSD with mathematics and science credits. Students who do not have the educational background can prepare themselves through some form of upgrading available through secondary schools, adult programming, or colleges, where upgrading courses are based on individual learning needs. The diagram on the next page shows the different ways that a person can enter the Health field.

Following that diagram are several school-related packages that illustrate the educational preparation for students interested in Health occupations. Some of these families of occupations can lead to different types of post-secondary school preparation. For example, a Diploma in Nursing is available through the colleges and Ryerson Polytechnical Institute, while preparation through the universities leads to a Bachelor of Science of Nursing degree (B.Sc.N.). Physiotherapy is also offered at the university and at the community college. However, these diagrams show the secondary school preparation leading to college programs only.

SCHOOL-TO-WORK ROUTES

HEALTH CARE OCCUPATIONS



** This program is intended primarily to upgrade individuals already employed in nursing homes or homes for the aged.*

Direct Care Occupations

There are many occupations associated with direct health care, although the nursing and nursing assistant occupations are probably the most well known. Other occupations in this family are Ambulance and Emergency Care, Chiropody, Denture Therapy, and Health Care Aide occupations. These occupations attract individuals who are interested in providing some type of health care directly to individuals, and in a wide variety of working environments such as hospitals, nursing homes, community health centres, public health units, industrial plants, schools, or often associated with a doctor's or dentist's office.

These occupations require similar secondary school preparation. The chart on the following page lists the courses that provide the necessary background and skills. The fundamental skills are those of communication (listening, speaking, and writing), mathematics and science skills on which the post-secondary education is based, and those skills associated with problem-solving.

In addition, it is suggested that students interested in this area become computer literate so that they can access medical and patient information by means of the computer. Furthermore, anyone interested in pursuing one of these Direct Care occupations should complete standard courses in First Aid and Cardiopulmonary Resuscitation (CPR). Often these courses are available as extra-curricular courses in secondary school.

All these secondary school courses and any type of related working experience will help the student to decide which of these occupations he or she prefers, and also this background will make the post-secondary program much more meaningful.

DIRECT CARE OCCUPATIONS

RECOMMENDED CORE COURSES

Grades 9 & 10	Grades 11 & 12
● ENGLISH (ENG 1, 2)	● ENGLISH (ENG 3, 4)
	● BUSINESS ENGLISH (EBS/BBS)
● MATHEMATICS (MAT 1,2)	MATH (MTA 3, 4)
● SCIENCE (SCI 1, 2)	HUMAN BIOLOGY (SBH) or BIOLOGY (SBI)
	CHEMISTRY (SCA/SCH) or PHYSICS (SPA/SPH)
● PHYSICAL & HEALTH EDUCATION	PHYSICAL & HEALTH EDUC. (PHM/PHF)

SUGGESTED SUPPORT COURSES

● BIOLOGICAL SCIENCE (SBI)	● FAMILY STUDIES (NFF/NFR)
	ANOTHER SCIENCE
● TYPING/KEYBOARDING (BKT/BKI)	DATA PROCESSING (DCP/DPA/DPT)
or	
INTRO. TO COMPUTERS (DIC)	

● COURSE(S) MAY COUNT TOWARDS THE 16-CREDIT REQUIREMENTS.
CHECK WITH THE GUIDANCE COUNSELLOR FOR SPECIFIC CREDIT(S).

OSSD

TO WORK

Few positions actually exist in the Direct Care Occupations without specific post-secondary preparation. Jobs supportive to the institution, such as working in the hospital laundry, kitchen, or maintenance areas may be considered, however.

TO COLLEGE

2 sem	Ambulance & Emergency Care Assisting (with Driver Training course).
21-24 months	Nursing (specific entrance requirements vary by college)
2 sem	Nursing Assisting
22 months	Chiropody
6 sem	Denture Therapy
16 wk	Health Care Aide

Note: sem = Semester

83

90

91

Rehabilitation Care Occupations

Physiotherapy and Occupational Therapy are examples of two of the more popular Rehabilitation Care occupations. Again, although preparation for both occupations can occur in the university and college setting, only the route leading to entrance into the college programs is shown here.

Both occupations are quite demanding, requiring problem-solving and inter-personal skills most of the time. The physiotherapist plans and carries out a program of therapy to restore an individual's movement or ability. An occupational therapist assesses the functional limitation of an individual's physical, emotional, or developmental ability and assists that person through appropriate activities to have a responsible role in the family and society.

The recommended core courses are to develop the student's communication and problem-solving skills, and his or her level of knowledge of the workings of the human body and how to keep the human system operating in good health. It is recommended that students take Mathematics, Science, and Health courses right through secondary school.

The suggested support courses in sciences, particularly the Biological Science (and mathematics) reinforce the biological studies taken in the other courses. And, as many of these occupations are using computers to document patient information and provide needed medical information, a student should become familiar with this contemporary office technology.

REHABILITATION CARE OCCUPATIONS

RECOMMENDED CORE COURSES

Grades 9 & 10	Grades 11 & 12
● ENGLISH (ADVANCED) (ENG 1, 2)	● ENGLISH (ADVANCED) (ENG 3, 4)
	● BUSINESS COMMUNICATIONS (EBS/BBS)
● MATH (ADVANCED) (MAT 1, 2)	MATH (MTA 3, 4)
● SCIENCE (ADVANCED) (SCI 1, 2)	2 of BIOLOGY, CHEMISTRY, PHYSICS (ADVANCED)
● PHYSICAL & HEALTH EDUCATION	PHYSICAL & HEALTH EDUC. (PHM/PHF)

OSSD

TO WORK

Few positions actually exist in the Rehabilitation Care Occupations without specific post-secondary preparation. Jobs supportive to the institution, such as working in the hospital laundry, kitchen, or maintenance areas may be considered, however.

TO COLLEGE

6 sem PHYSIOTHERAPY (with Gr. 12 advanced Math)

6 sem OCCUPATIONAL THERAPY

6 sem RESPIRATORY TECHNOLOGY

4 sem ORTHOTIC/PROSTHETIC TECHNOLOGY

SUGGESTED SUPPORT COURSES

● BIOLOGICAL SCIENCE (SBI)	HUMAN BIOLOGY (SBH)
	ANOTHER SCIENCE (ADVANCED)
	● FAMILY STUDIES (NFF/NFR)
● TYPING/KEYBOARDING (BKT/BKI) or INTRO. TO COMPUTERS (DIC)	DATA PROCESSING (DCP/DPA/DPT)

● COURSE(S) MAY COUNT TOWARDS THE 16-CREDIT REQUIREMENTS.
CHECK WITH THE GUIDANCE COUNSELLOR FOR SPECIFIC CREDIT(S).

Note *sem = Semester*

Diagnostic Support Occupations

Someone considering work in one of the many Diagnostic Support occupations will find himself or herself being part of a health care team. Two of these occupations are Radiological Technology and Medical Laboratory Technology. Much of the time is spent taking different tests such as X-rays, performing analytical data on various bodily tissues, and maintaining records.

The recommended core courses are to provide the student with the competencies in working in these technologies and revolve around a thorough knowledge, understanding, and application of chemistry, physics, and biology. A student must learn to apply his or her knowledge towards solving problems in related areas. Therefore the mathematics and science courses are essential. Chemical and numerical data must be calculated and analyzed continuously.

The suggested support courses are to more fully prepare a student for entrance into and success in one of the many community college programs. In addition, as computer technology is being used in these occupations to facilitate the analysis and storage of information, some data processing skills would be very valuable to the student.

The post-secondary preparation for these occupations occurs within community colleges, some hospitals, and special-training institutes such as the Toronto Institute for Medical Technology. All programs involve extensive practical experience in hospitals. The chart on the next page, however, only indicates the route leading to preparation in the colleges.

DIAGNOSTIC SUPPORT OCCUPATIONS

RECOMMENDED CORE COURSES

Grades 9 & 10	Grades 11 & 12
● ENGLISH (ENG 1, 2)	● ENGLISH (ENG 3, 4)
	● BUSINESS ENGLISH (EBS/BES)
● MATH (MAT 1, 2)	MATH (MTA 3, 4)
● SCIENCE (SCI 1, 2)	CHEMISTRY (SCH)
● KEYBOARD/INTRO TO COMPUTERS (BKI/DIC)	PHYSICS (SPH) or BIOLOGY (SBI)
● PHYSICAL & HEALTH EDUCATION	PHYSICAL & HEALTH EDUC. (PHM/PHF)

OSSD

SUGGESTED SUPPORT COURSES

ADVANCED ENGLISH, MATH, SCIENCE	ANOTHER SCIENCE
● BIOLOGICAL SCIENCE (SBI)	HUMAN BIOLOGY (SBH)
	ADVANCED ENGLISH, MATH, SCIENCE
	WORD/DATA PROCESSING (BKW/DPC)
	PROGRAMMING (DSC)

● COURSE(S) MAY COUNT TOWARDS THE 16-CREDIT REQUIREMENTS. CHECK WITH THE GUIDANCE COUNSELLOR FOR SPECIFIC CREDIT(S).

TO WORK

Few positions actually exist in the Diagnostic Support Occupations without specific post-secondary preparation, other than perhaps that of a laboratory or general assistant. Jobs supportive to the institution, such as working in the hospital laundry, kitchen, or maintenance areas may be considered, however.

TO COLLEGE

6 sem MEDICAL LABORATORY TECHNOLOGY (specific entrance requirements vary by college)

4 sem RADIOLOGY TECHNOLOGY (with advanced courses)

Note: sem = Semester

Other Health Care Service Occupations

Examples of other popular but less demanding occupations in Health Care Services are occupations such as Dental Assistant and Pharmacy Assistant. The Dental Assistant contributes to the smooth running of the dentist's office by preparing instruments and materials for the dentist, acting as the chair-side assistant to the dentist, and carrying out various office and receptionist duties. Further preparation in the Dental Care field can lead to qualification as a Dental Hygienist, who performs preventive dental treatment procedures such as oral hygiene instruction and scaling and polishing of the teeth. And the Pharmacy Assistant works under the supervision of a pharmacist to order supplies, maintain records of sales and purchases of drugs, check inventories, repackage, and dispense.

These occupations all require similar secondary school education. The chart on the following page stresses the fundamental skills of communication (listening, speaking, and writing), and courses which deal with problem-solving skills and the human body. The science courses provide the basics upon which the post-secondary preparation is built. Students should begin to understand the functions of the different parts of the body, and to recognize their dysfunctioning.

Extra-curricular courses in both First Aid and Cardiopulmonary Resuscitation (CPR) are suggested prior to specific post-secondary preparation. And for those considering a career as a Dental Assistant, good receptionist skills and a knowledge of accounting and/or office procedures are beneficial. Many of the dental offices and pharmacies are using computers now for patient files so competency in data or word-processing would also be helpful.

OTHER HEALTH CARE SERVICE OCCUPATIONS

RECOMMENDED CORE COURSES

Grades 9 & 10	Grades 11 & 12
● ENGLISH (ENG 1, 2)	● ENGLISH (ENG 3, 4)
	● BUSINESS ENGLISH (EBS/BBS)
● MATH (MAT 1, 2)	MATH (MTA 3, 4)
● SCIENCE (SCI 1, 2)	HUMAN BIOLOGY/BIOLOGY (SBH/SBI)
	CHEMISTRY (SCH/SCA)
*● TYPING/KEYBOARDING (BKT/BKI)	* WORD PROCESSING (BKW)
● PHYSICAL & HEALTH EDUCATION	PHYSICAL & HEALTH EDUC. (PHM/PHF)

OSSD

TO WORK

Few positions actually exist in the Health Care Service Occupations without specific post-secondary preparation. Some peripheral jobs such as typist or receptionist in a medical or dental office, or a salesperson in a drugstore, may be considered, however.

SUGGESTED SUPPORT COURSES

● BIOLOGICAL SCIENCE (SBI)	* INTRO TO BUSINESS (BKI)
	* OFFICE PROCEDURES (BOS/SOP)
	* ACCOUNTING (BAI/BAP)
	PHYSICS (SPH/SPA)
	● FAMILY STUDIES (NEF/NER)
INTRO TO COMPUTERS (DIC)	DATA PROCESSING (DPC)

TO COLLEGE

* 2 sem DENTAL ASSISTANT
  (+ 1 yr. work experience qualifies for entry into 4 sem DENTAL HYGIENIST)

2 sem PHARMACY ASSISTANT

* *HEALTH RECORD PERSONNEL (Requirements and program length vary by college.)*

● COURSE(S) MAY COUNT TOWARDS THE 16-CREDIT REQUIREMENTS.
CHECK WITH THE GUIDANCE COUNSELLOR FOR SPECIFIC CREDIT(S).

Note: sem = Semester

With the rapid advancement and changes in technology, a wide range of occupations is opening up which require some type of post-secondary preparation in addition to the more common trades which do not. People are not even aware that many of these occupations exist or that there is a high demand for people (both men and women) in them. Some of the Technological Occupations include such families as:

Motive Power (Auto) Occupations;
Electronics/Electrical/Computer Technology;
Civil/Architectural/Construction Occupations;
Mechanical/Metal Working Occupations;
Drafting Occupations.

Jobs in the Technological Occupations include the whole range from indoor to outdoor work, from servicing to manufacturing, and in positions for apprentices, then journeypersons, technicians, technologists, and engineers, depending on one's training. Many more jobs are expected to open up in the service sector over the next few years.

Preparation for these occupations can begin in secondary school, and include training in the community colleges, private trade schools, or on the shop floor. Some students who withdraw from school after Grade 10 and who find jobs in one of the trades become apprentices where they combine both school and work until they graduate as journeypersons. Through adult or continuing education programs, students who do not complete secondary school can prepare themselves for either a two-year college technical program or a three-year college technology program. Some students often take only the two-year college technician program and decide to come back later for one to one and one-half years for a technological diploma. Others may go on to university. The diagram on page 92 shows the many paths that a person interested in this area can follow (other than the university route).

Students interested in the technological occupations should have good communications skills, problem-solving skills which a solid mathematics background provides, manual dexterity, an ability to work in three dimensions, and show a willingness to work.

The packages of the different families of technological occupations listed on the following pages illustrate the preparation that can lead to jobs within the technological area. All programs recommend the Math for Technology course, Applied Physics, Applied Chemistry, and the Technological Science course in the Senior division, in addition to the Business English course as the fifth required English course. All packages introduce students to the tools of the trade, what each tool and piece of equipment is used for, accident prevention, and some "trouble-shooting" skills to discover which parts of equipment are inoperable.

In each of the five different Technological packages, there are generally four courses listed under "Recommended Core Courses" which are grouped together. Each of these courses may be taken for one-quarter credit OR one-half credit OR one full credit course. But all of these courses are recommended to be taken sometime in Grades 9 and/or 10. In addition, those courses under "Suggested Support Courses" are considered particularly important for those

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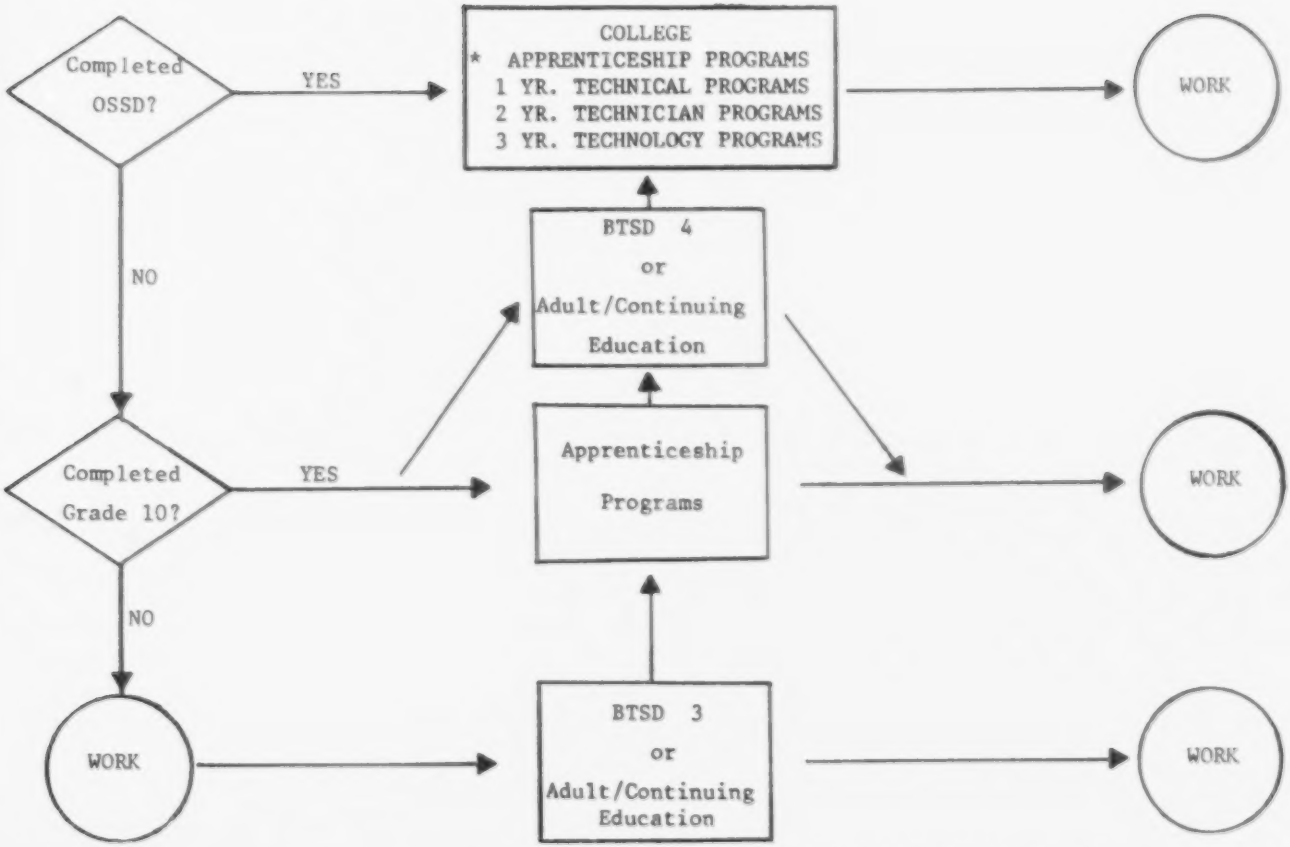
students heading directly for the world of work. Therefore, as many courses as possible in this group should be taken by the student.

Students are also encouraged to pursue an occupational interest by going into the workplace while still in school. A Co-operative Education program is available in most schools to encourage this type of on-the-job training. Also, students would be wise to take the First Aid or Cardiopulmonary Resuscitation (CPR) courses, if they have the opportunity during secondary school.

For all students, but probably more importantly for students intending to work directly after secondary school graduation, a "Technology Endorsement" on their transcript may be desirable. Remember -- in order to have this endorsement for Technological Studies on your transcript, you must take eight (single) credit courses which start with "T" while in secondary school.

SCHOOL-TO-WORK ROUTES

TRADES & TECHNOLOGY OCCUPATIONS



* *Apprenticeship programs combine practical on-the-job training and theory spread out over three or four years. The theory portion of the program usually occurs in colleges for approximately 16 weeks a year. Most programs require a Grade 12 education, but a few require a Grade 10 certificate only.*

Motive Power Occupations

The (Auto) Motive Power Occupations can offer a student a wide range of careers through the apprenticeship, technical, or technology routes. There are many careers which deal with vehicles or parts of vehicles, ranging from their manufacturing, servicing or repairing, to selling or operating. Motive Power vehicles can include such "mobiles" as lawnmowers, power boats, motorcycles, automobiles, trucks, trains, aircrafts, and snowmobiles.

All students should be grounded in the fundamental safety principles in the shop and work place -- how to prevent accidents and what to do if an accident occurs. They should also develop an understanding of the different parts of the vehicles and their functioning.

In addition, the recommended core courses allow a student an introduction to the vast number of occupations in this field -- dealing with the whole vehicle or its parts.

Courses from the list of suggested support courses can help a student prepare for a specific occupation within this family. Since most modern vehicles incorporate computer technology, a student should be computer literate. In addition, courses such as First Aid and the driver-training course (TAD) may be of benefit to the student.

MOTIVE POWER (AUTO) OCCUPATIONS

RECOMMENDED CORE COURSES

Grades 9 & 10	Grades 11 & 12
● ENGLISH (ENG 1, 2)	● ENGLISH (ENG 3, 4)
	● BUSINESS ENGLISH (EBS/BBS)
● MATH (MAT 1, 2)	MATH FOR TECHNOLOGY (MTC 3, 4)
● SCIENCE (SCI 1, 2)	CHEMISTRY (SCA)
	PHYSICS (SPA)
● AUTO MECHANICS/AUTOBODY REPAIR (TAM/TAB)	AUTOBODY MECHANICS/AUTOBODY REPAIR (TAM/TAB)
● ELECTRICAL (TEA)	ELECTRICAL ELECTRONICS (TEL/TEY)
● WELDING (TMW)	

OSSD

SUGGESTED SUPPORT COURSES

DRAFTING (TDM)	TECHNOLOGICAL SCIENCE (STE)
KEYBOARDING/INTRO TO COMPUTERS (BKI/DIC)	POWER TRANSMISSION & CONTROL (TMC)
	HYDRAULICS/PNEUMATICS (TMH)
	AUTO SERVICE (TAS)
	DRAFTING (TDM)
	WELDING (TMW)
	SERVICE STATION ATTENDANT (TAS)
	AGRICULTURAL EQUIPMENT SERVICE (TAC)

TO WORK

MILLWRIGHT APPRENTICESHIPS

MOTIVE APPRENTICESHIPS

AUTOMOTIVE SALES/SERVICE

SERVICE STATION ATTENDANT

LABOURER

DRIVER

AUTOMOTIVE FABRICATION, ASSEMBLING, INSTALLATION, REPAIR, INSPECTING, TESTING

RECREATION VEHICLE SERVICE

TO COLLEGE

4 sem MOTIVE POWER TECHNICIAN in

AUTOMOTIVE,

DIESEL,

HEAVY EQUIPMENT OPERATION

or

SERVICE MANAGEMENT

2 sem AUTOMOTIVE MERCHANDISING

● COURSE(S) MAY COUNT TOWARDS THE 16-CREDIT REQUIREMENTS. CHECK WITH THE GUIDANCE COUNSELLOR FOR SPECIFIC CREDIT(S).

*** Courses may be taken as 1/4 or 1/2 credits or in blocks for 1 or 2 credits

Note: sem = Semester

Electronics, Electrical Technology, and Computer Technology Occupations

A person with manual dexterity skills and a logical, analytic mind may enjoy one of the many occupations in Electronics, Electrical, or Computer Technology. Again, this family of occupations can be entered directly from school or two- or three-year preparatory programs at the community college.

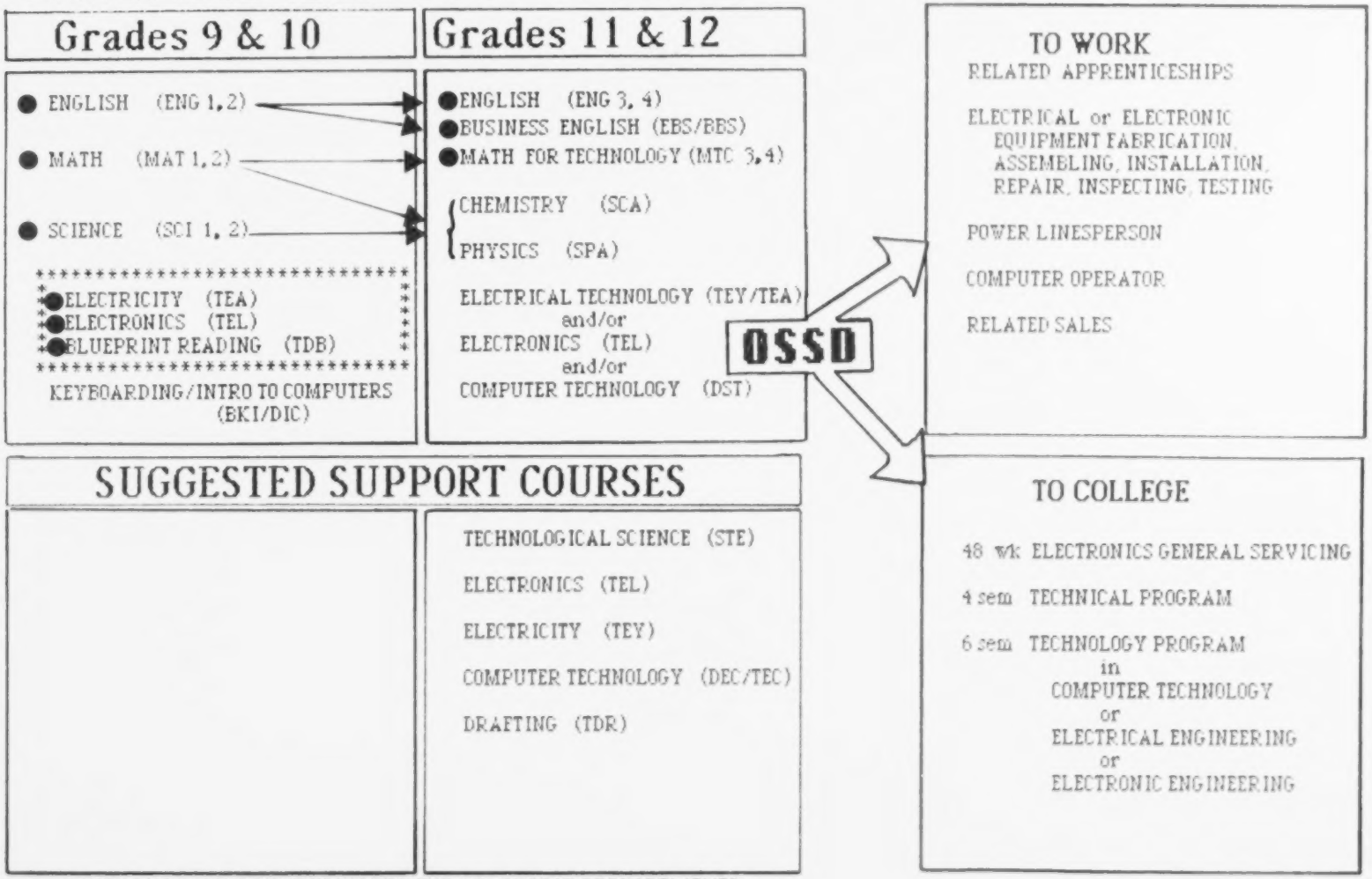
For those people who enjoy problem-solving and working on their own, these occupations prove very rewarding.

The recommended core courses, in addition to English, math, and science, are to introduce the student to the occupations as well as to provide a background in drafting and blueprint reading. Safety in the shop and workplace, plus the proper use of tools, are most important in these occupations. Basic Physics concepts are applied in all these areas, such as magnetism, circuitry, power, and energy. Since much of the modern technology will be using computers, a student should have a knowledge of how computers work and their capabilities.

The suggested support courses are designed to explore in depth one of these occupational groupings. A student can begin to focus his or her interests in the electronic field, electrical technology, computer technology, or even move into the area of drafting.

ELECTRONICS, ELECTRICAL, COMPUTER TECHNOLOGY OCCUPATIONS

RECOMMENDED CORE COURSES



SUGGESTED SUPPORT COURSES

TECHNOLOGICAL SCIENCE (STE)

ELECTRONICS (TEL)

ELECTRICITY (TEY)

COMPUTER TECHNOLOGY (DEC/TEC)

DRAFTING (TDR)

● COURSE(S) MAY COUNT TOWARDS THE 16-CREDIT REQUIREMENTS. CHECK WITH THE GUIDANCE COUNSELLOR FOR SPECIFIC CREDIT(S).

*** Courses may be taken as 1/4 or 1/2 credits, or in blocks for 1 or 2 credits

Note: sem = Semester

Civil, Architectural, and Construction Occupations

A person interested in the planning, design, construction, or maintenance of buildings may look toward occupations in civil engineering, architectural engineering, or construction. Indoor and outdoor jobs are available to the individual who wishes to work where there is more physical activity. A student can enter the field of his or her occupational choice immediately after secondary school, through an apprenticeship or linkage program, or following a two- or three-year college program or even a four-year university program.

The recommended core courses are to introduce the student to the different types and strengths of building materials, explore the occupational family, and provide the student with an appreciation of safety in the workplace and accident prevention. The student should be able to draw and interpret blueprints in order to design and build a project from scratch.

The suggested support courses are to offer the student who has a clearer idea of where he or she is going with the basic skills of each of those sub-familiies of occupations. Again, since much of the design of projects and storage of information will be computerized, a knowledge of the range and uses of computers would be beneficial.

CIVIL, ARCHITECTURAL, CONSTRUCTION OCCUPATIONS

RECOMMENDED CORE COURSES

Grades 9 & 10

- ENGLISH (ENG 1, 2)
- MATH (MAT 1, 2)
- SCIENCE (SCI 1, 2)
- CONSTRUCTION (TCY)
- DRAFTING (TDR)
- MATERIALS & PROCESSES (TIA)
- WOODWORK (TCW)

Grades 11 & 12

- ENGLISH (ENG 3, 4)
- BUSINESS ENGLISH (EBS/BBS)
- MATH FOR TECHNOLOGY (MTC 3, 4)
- CHEMISTRY (SCA)
- PHYSICS (SPA)
- ARCHITECTURAL DRAFTING (TDA) or CONSTRUCTION TECHNICIAN (TCY)

OSSD

TO WORK

RELATED APPRENTICESHIPS
CONSTRUCTION LABOURER
SURVEYOR ASSISTANT
MASON TRAINEE
PULP & PAPER MAKING
WOOD PROCESSING OCCUPATIONS
EXCAVATING, GRADING, PAVING
BRICK, STONE & TILE SETTERS (TROWEL TRADES)
RELATED SALES
BUILDING SUPERINTENDENT

SUGGESTED SUPPORT COURSES

- KEYBOARDING/INTRO TO COMPUTERS (BKI/DIC)
- TECHNOLOGICAL SCIENCE (STE)
- PROGRAMMING (DSC)
- STRENGTH OF MATERIALS (TMX)
- WOODWORK (TML)

TO COLLEGE

40 wk BUILDING MATERIAL SALES
4 sem ARCHITECTURAL TECHNICIAN
6 sem ARCHITECTURAL TECHNOLOGIST
4 sem SURVEY MAPPING TECHNICIAN
6 sem CIVIL ENGINEERING TECHNOLOGIST

COURSE(S) MAY COUNT TOWARDS THE 16-CREDIT REQUIREMENTS.
CHECK WITH THE GUIDANCE COUNSELLOR FOR SPECIFIC CREDIT(S).

*** Courses may be taken as 1/4 or 1/2 credits, or in blocks for 1 or 2 credits.

Note: sem = Semester

Mechanical and Metal Working Occupations

The Mechanical and Metal Working Occupations is a family of occupations for the person who enjoys working with his or her hands in a physically active job. A student can prepare him- or herself in secondary school to either enter directly in this field upon graduation or after a community college or university program, the latter to become a mechanical engineer.

The recommended core courses offer the student an opportunity to explore the different aspects of these occupations. A thorough knowledge of ratio and proportion and metric conversion is very important here in order to read and interpret line drawings and work in three dimensions. The Senior Division courses allow a student to begin to specialize in one of these sub-families of machine shop, welding, or mechanical technology. The care and use of the appropriate tools of the trade and an appreciation of shop and work safety and accident prevention will be stressed.

The suggested support courses are to offer the student a variety of choices to further reinforce the topics selected in the recommended core courses. A fundamental understanding of drafting and a reinforcement of the physics concepts related to electricity and electronics would help round out a student's background.

MECHANICAL AND METAL WORKING OCCUPATIONS

RECOMMENDED CORE COURSES

Grades 9 & 10

- ENGLISH (ENG 1, 2)
- MATH (MAT 1, 2)
- SCIENCE (SCI 1, 2)

- MACHINE SHOP (TMS)
- WELDING (TMW)
- DRAFTING (TDR)
- AUTO MECHANICS (TAM)

BLUEPRINT READING (TDB)

Grades 11 & 12

- ENGLISH (ENG 3, 4)
- BUSINESS ENGLISH (EBS/BBS)
- MATH FOR TECHNOLOGY (MTC 3, 4)
- CHEMISTRY (SCA)
- PHYSICS (SPA)

MACHINE SHOP (TMS)
and/or
MECHANICAL TECHNOLOGY (TMY)

OSSD

TO WORK

RELATED APPRENTICESHIPS
SHEET METAL WORKER
WELDER TRAINEE
TOOL & DIE TRAINEE
AUTOBODY REPAIRER, CUSTOM WORK
PIPEFITTER
METAL FABRICATION
ASSEMBLING, INSTALLATION, REPAIR, INSPECTING, TESTING
MACHINIST OCCUPATIONS
RELATED SALES

TO COLLEGE

48 wk MACHINE SHOP
4 sem INSTRUMENT ENGINEERING TECHNICIAN
4 sem MECHANICAL ENGINEERING TECHNICIAN
6 sem MECHANICAL TECHNOLOGIST
4 sem WELDING TECHNICIAN
6 sem WELDING ENGINEERING TECHNOLOGIST
4 sem INDUSTRIAL ENGINEERING TECHNICIAN
6 sem INDUSTRIAL ENGINEERING TECHNOLOGIST

Note: sem = Semester

SUGGESTED SUPPORT COURSES

KEYBOARDING/INTRO TO COMPUTERS (BKI/DIC)

- TECHNOLOGICAL SCIENCE (STE)
- MECHANICAL DRAFTING (TDM)
- SHEET METAL (TMT)
- INSTRUMENTATION (TMI)
- ROBOTICS (TMW)
- COMPUTER STUDIES (DEC, DSC)

- COURSE(S) MAY COUNT TOWARDS THE 16-CREDIT REQUIREMENTS. CHECK WITH THE GUIDANCE COUNSELLOR FOR SPECIFIC CREDIT(S).

*** Courses may be taken as 1/4 or 1/2 credits, or in blocks for 1 or 2 credits.

Drafting Occupations

A person interested in the world of drafting can enter this field directly, or indirectly through the architectural, electrical, mechanical, or civil occupations.

All students must have a fundamental background in mathematics in order to calculate ratio and proportion. The student must have manual dexterity to be able to sketch drawings in proportion and/or use the computer to carry out the design work. Also a student must be able to read, draw, interpret, and follow blueprints in one, two, and three dimensions.

In addition to the other recommended courses, the core courses include an introduction to the different families which use drafting (construction, electricity, or mechanics) and then more drafting courses, as well.

Other suggested support courses are blueprint reading, drawing, and an introduction to computers leading to the new and exciting field of computer assisted design (CAD).

DRAFTING OCCUPATIONS

RECOMMENDED CORE COURSES

Grades 9 & 10

- ENGLISH (ENG 1, 2)
- MATH (MAT 1, 2)
- SCIENCE (SCI 1, 2)

****
* ●CONSTRUCTION (TCY) *
* ●ELECTRICAL (TEA) *
* ●MECHANICS (TAM/TAE/TMS) *
* ●BLUEPRINT READING (TDB) *
****

DRAFTING (TDR)

Grades 11 & 12

- ENGLISH (ENG 3, 4)
- BUSINESS ENGLISH (EBS/BBS)
- MATH FOR TECHNOLOGY (MTC 3, 4)
- CHEMISTRY (SCA)
- PHYSICS (SPA)

DRAFTING (TAD/TDE/TDM/TDR 3, 4)

OSSD

TO WORK

JUNIOR DRAFTSPERSON

DESIGNER TRAINEE

RELATED APPRENTICESHIP

SALES IN ARCHITECTURE, ELECTRICAL or MECHANICAL

COMMERCIAL ARTIST

GRAPHICS DESIGNER

SUGGESTED SUPPORT COURSES

KEYBOARDING/INTRO TO COMPUTERS (BKI/DIC)

DESIGN STUDIES (TID)

- ART (AVE)

BLUEPRINT READING (TDB)

TECHNICAL SCIENCE (STE)

DATA PROCESSING (DEC)

DESIGN STUDIES (TID)
ENGINEERING GRAPHICS (TGX)
WOODWORK (TML)
or
ELECTRICITY/ELECTRONICS (TEX/TEL)
or
GRAPHICS COMMUNICATION (TGR)

TO COLLEGE

40 wk DRAFTING

4 sem DRAFTING TECHNICIAN

6 sem TECHNOLOGY PROGRAM
in
ARCHITECTURE,
ELECTRICAL,
MECHANICAL,
or
CIVIL ENGINEERING

- **COURSE(S) MAY COUNT TOWARDS THE 16-CREDIT REQUIREMENTS. CHECK WITH THE GUIDANCE COUNSELLOR FOR SPECIFIC CREDIT(S).**

*** Courses may be taken as 1/4 or 1/2 credits, or in blocks for 1 or 2 credits.

Note: sem = Semester